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THE TAXONOMY OF SOME BRITISH ENCYRTID PARASITES (HYMENOPTERA) OF SCALE INSECTS (COCCIDOIDEA).

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With 80 Text-figures.

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I. Introduction.

The earliest detailed approach to the taxonomy of the family Encyrtidae can be traced back to the fourth quarter of the last century, when Mayr (1875) and Thomson (1876) published very useful monographs on the European and Scandinavian Encyrtids respectively. The first consolidated work on the Encyrtids of Europe and America, produced by Ashmead (1904), includes 90 genera distributed over four tribes. In his divisions the dentation of the mandibles and the condition of the hypopygium are important characters. He was followed by Schmiedeknecht (1909), who made no very significant

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deviations. Girault (1915) divided the family Encyrtidae into five subfamilies, of which the Signophorinae and Encyrtinae combine to form the family Encyrtidae of most modern authors.

Mercet's (1921) *Encirtidos de la Fauna Iberica* is a remarkable work describing 93 genera and 224 species. He discarded Ashmead's scheme of four tribes and divided the entire family into two very unequal subfamilies, *viz.* Arrenofaginos, with the solitary genus *Arrhenophagus*, and Encirtinos with 92 genera. The subfamily Encirtinos being very large, Mercet divided it into 12 groups, which has made his key to genera more workable.

Ferrière's (1953*b*) *Encyrtides paléarctiques* is an excellent compilation of 123 genera distributed over four subfamilies, *viz.* Antheminae, Arrhenophaginae, Signiphorinae and Encyrtinae. He, like Mercet (1921), could not avoid making the subfamily Encyrtinae very large. It contains all but six of the genera, which go to form the remaining three subfamilies. Ferrière tried to group the genera but admits that few of his groups are natural.

Westwood and Walker in the last century described Encyrtidae from Great Britain, and Morley (1910) listed 24 genera with 134 species. More recently Kloet and Hincks (1945) have given an up-to-date list of 38 genera in this family. There is, however, very little information on the hosts of British species.

The present work is a study of the family Encyrtidae with reference to coccid hosts in Great Britain. A large number of coccids, found in the grounds of the Imperial College Field Station, Silwood Park, Berks., were bred; 19 species of Encyrtids, of which 15 were new, spread over 13 genera, were found parasitising them. The genera *Thomsonisca* Ghesquière, *Doliphoceras* Mercet, *Psyllaephagus* Ashmead, *Pseudorhopus* Timberlake and *Protyndarichus* Mercet are new to Great Britain. The total number of British genera is, therefore, 45. The genus *Psyllaephagus* is for the first time recorded as bred from scale insects.

The family Encyrtidae appears to be well represented in Great Britain but no key to the British genera is available. The following key is based on specimens bred from coccids, and is open to expansion so as to accommodate, in future, all the recorded genera.

II. Key to the Genera of Encyrtidae Bred at Silwood, Based on Females.

1 Wings well developed; submarginal vein without triangular expansion 2

– Wings rudimentary (in winged species lightly smoky in apical third; submarginal vein with a triangular expansion); frontovertex narrower than eye; funicle segments almost as long as wide, uniformly coloured; club elongate; subgenital plate very narrow in middle with the knob, on each side of the posterior notch, followed by a long curved ridge; basal third of ovipositor concealed by subgenital plate; outer plates of ovipositor with marginal inflection along dorsal margin; second valvifers very narrow **Protyndarichus Mercet**

2 Funicle with 6 segments 3

– Funicle with 5 segments; club entire, almost as long as funicle; frontovertex wide; wings hyaline; submarginal vein short, other veins not very distinct; pronotum moderately broad with anterior

margin considerably concave in middle; first and fifth segments of hind tarsi of the same length; subgenital plate quadrilateral in shape, concealing almost the entire ovipositor; outer plates of ovipositor short, greatly widened in middle with pointed apex; second valvifers short and uniformly narrow; third valvulae resembling ill-defined stumpy extensions of second valvifers

Pseudorhopus Timberlake

3 Scutellum with a cluster of long thick setae on apical half 4
– Scutellum without any such cluster on apical half 5
4 Wings hyaline; submarginal vein a little curved; marginal vein not or somewhat longer than stigmal vein; segments of funicle broader than long; club not or slightly shorter than funicle; pronotum clearly narrow in middle; subgenital plate broad with notch in its posterior margin very small, knobs on sides of notch followed by laterally directed long ridges; outer plates of ovipositor more or less uniformly broad; third valvulae conical with tapering apex

Apterencyrtus Ashmead

– Wings more or less smoky; submarginal vein strongly curved in distal third; marginal vein distinctly longer than stigmal vein; first funicle segment longer than broad; club distinctly shorter than funicle; pronotum with middle region not narrow; subgenital plate narrow with a wide notch in posterior margin; knobs on sides of notch not followed by laterally directed ridges; ovipositor slightly exserted; apical half of outer plates of ovipositor clearly much wider than the basal half; third valvulae uniformly broad with broadly rounded apex . . . . . **Chiloneurus** Westwood
5 Marginal vein punctiform 9
– Marginal vein clearly longer than wide 10
6 Antennae inserted very close to lower clypeal margin 7
– Antennae inserted between lower clypeal margin and lower border of eyes; pronotum uniformly broad with distinctly curved posterior margin; middle of anterior margin of subgenital plate cone-like and connected with the central notch of posterior margin by a narrow longitudinal groove; basal third of ovipositor concealed by subgenital plate; outer plates of ovipositor uniformly broad with marginal inflection along basal third of dorsal margin; first valvifers like elongate triangles with acute apex; third valvulae with broadly rounded apex; abdomen short; size 1·0–1·5 mm.

Psyllaephagus Ashmead

7 Mandibles tridentate; wings hyaline or lightly smoky 8
– Mandibles bidentate; frontovertex wide; club 2- to 3-segmented; wings hyaline; pronotum highly constricted in middle; subgenital plate with broadly rounded posterior margin; outer plates of ovipositor more or less uniformly broad; second valvifers short and moderately broad, third valvulae imperceptible

Xanthoencyrtus Ashmead

8 Maxillary palps 2- to 4-segmented; labial palps 2- to 3-segmented; anterior margin of pronotum deeply concave in middle; hind coxae generally without coxal suture; posterior margin of subgenital plate straight; basal half of ovipositor concealed under subgenital plate; knobs on sides of central notch of posterior margin of subgenital plate with or without laterally directed ridges; apical half of outer plates of ovipositor wider with tapering apex not reflected upward; first valvifers triangular; third valvulae

generally concealed and immovably joined with second valvifers . 9

– Maxillary palps 3- to 4-segmented; labial palps 2-segmented; anterior margin of pronotum not deeply concave in middle; hind coxae with distinct coxal suture; V-shaped subgenital plate extends to apex of abdomen; knobs on sides of posterior notch of subgenital plate with anteriorly directed ridges; outer plates of ovipositor uniformly broad with broad apex reflected upward; first valvifers semicircular; third valvulae greatly exserted and movably joined with second valvifers . . . . . **Aphycus** Mayr

9 Maxillary palps 4-segmented, rarely 3-segmented; labial palps 3-segmented; scutum with traces of parapsidal sutures; hind coxae sometimes with faint coxal suture; knobs, on sides of central notch of posterior margin of subgenital plate without laterally directed ridges; anterolateral apodemes of subgenital plate narrow and directed mesally; outer plates of ovipositor with narrow submarginal ridge along basal two-thirds of dorsal margin **Metaphycus** Mercet

– Maxillary and labial palps each 2-segmented; scutum entire; hind coxae without coxal suture; knobs on sides of central notch of posterior margin of subgenital plate with laterally directed ridges; anterolateral apodemes of subgenital plate broad and anteriorly directed; major portion of mid-longitudinal area of outer plates of ovipositor greatly thickened . . . . . **Euaphycus** Mercet

10 Pedicel shorter than first funicle segment 11

– Pedicel longer than first funicle segment; proximal segments of funicle short and subquadrate, distal segments transverse and clearly wider than long; stigmal vein longer than marginal vein; mid-longitudinal groove of subgenital plate flanked on sides by ridges which extend to the respective knobs of the central notch of the posterior margin, subgenital plate with straight posterior margin covering only basal half of ovipositor; outer plates of ovipositor very broad in apical half and with a biramous submarginal ridge along dorsal margin; third valvulae in ball-and-socket-like articulation with second valvifers . . . . . **Aphycoides** Mercet

11 Frontovertex wide and without big punctures; maxillary palps 3-segmented; labial palps 2-segmented 12

— Frontovertex narrow with distinct large puncture; maxillary and labial palps 4- and 3-segmented respectively; apical segments of funicle depressed and much wider than basal segments; fore wings sometimes with 2 transverse smoky bands; scutellum convex with rounded border; posterolateral area of propodeum with cluster of white setae; anterior margin of subgenital plate produced conically in the middle, while knobs, on sides of central notch of posterior margin, are followed by short ridges; outer plates of ovipositor moderately broad with apical half broader; first valvifers like elongate triangles with acute vertex and curved base **Trichomasthus** Thomson

12 Mandibles with 2 teeth and 1 broad truncation; border of occiput rounded; stigmal vein short and equal to marginal vein in length; pronotum moderately broad with narrow middle region; abdomen subtriangular and wider than thorax; subgenital plate uniformly broad with very wide mid-longitudinal groove, knobs, on sides of notch of posterior margin, followed by laterally directed ridges; basal half of ovipositor concealed by subgenital plate; apical half

of outer plates of ovipositor wide with narrowly rounded apex ; first valvifers like elongate triangles . . . . . **Thomsonisca** Ghesquière

— Mandibles bidentate ; border of occiput not distinctly acute ; stigmal vein long, longer than marginal vein ; pronotum uniformly broad ; abdomen triangular and narrower than thorax ; subgenital plate V-shaped with greatly reduced posterior margin ; entire ovipositor concealed by subgenital plate ; basal half of outer plates of ovipositor moderately broad while the apical half is sharply attenuated ; first valvifers oblong ; third valvulae like ill-defined, long finger-like extensions of second valvifers . . . . . **Doliphoceras** Mercet

1. *Metaphycus* Mercet.

This is one of the easily recognisable genera of the family Encyrtidae. The following new characters are suggested to strengthen its separation from the closely allied genus *Euaphycus* Mercet :

Hind coxae sometimes with faint coxal suture (fig. 9, *cxs*) ; knobs on sides of central notch of posterior margin of subgenital plate without laterally directed ridges (fig. 5, *k*) ; anterolateral apodemes of subgenital plate narrow and mesally directed (*a*) ; outer plates of ovipositor with narrow submarginal ridge along basal two-thirds of dorsal margin (fig. 2, *sr*).

A few setal characters have been studied in *M. taxi* sp. n., as well as in other species reared, and the following revised key is proposed.

Revised Key Based on Females.

1 Maxillary palps 3-segmented ; 2 of the funicle segments equal in length ; segment 6 longest ; 2–4 short, stout pegs on distal rim of middle tibiae 2

– Maxillary palps 4-segmented ; all funicle segments of unequal length, segment 5 longest ; more than 4 short, stout pegs on distal rim of middle tibiae 3

2 Scape 9 times longer than wide ; first 2 funicle segments equal in length ; club 2·5 times longer than wide ; length of malar space slightly less than 1·5 times width of frontovertex ; longitudinal diameter of eyes about twice length of malar space and over 2·5 times width of frontovertex ; 9 pairs of long setae along posterior margin of pronotum ; 2 stout, thick setae in dorsal angle of distal rim of fore tibiae ; 4 short, stout pegs on distal rim of middle tibiae ; 9 short, stout setae on distal rim of hind tibiae ; ovipositor exserted for one-eighth length of abdomen . . . . . **M. eriococci** sp. n.

– Scape hardly 3·5 times longer than wide ; funicle segments 2–4 of the same length ; club 1·5 times longer than wide ; malar space as long as half width of frontovertex ; longitudinal diameter of eye over 4 times longer than malar space and slightly less than twice width of frontovertex ; 10 pairs of long setae along posterior margin of pronotum ; 2 stout, thick setae close to base of tibial spur of fore tibiae ; 2 short, stout pegs on distal rim of middle tibiae ; 11 short, stout setae on distal rim of hind tibiae ; ovipositor concealed . . **M. taxi** sp. n.

3 Scape less than 3·5 times longer than wide ; third funicle segment the shortest ; longitudinal diameter of eye 2·5 times longer than malar space, and than width of frontovertex ; 12 pairs of long setae along posterior margin of pronotum ; 1 stout, thick seta near base of tibial spur of fore tibiae ; 6 short, stout pegs on distal rim of middle tibiae ; 10 short, stout setae on distal rim of hind tibiae
M. zebratus Mercet (Silwood material)

– Scape over 3·5 times longer than wide ; second funicle segment the shortest ; longitudinal diameter of eye over 3 times longer than malar space, and than the width of frontovertex ; 13 pairs of long setae along posterior margin of pronotum ; 2 short, thick setae near dorsal angle of distal rim of fore tibiae ; 7 short, stout pegs on distal rim of middle tibiae ; 14 short, stout setae on distal rim of hind tibiae . . . . . **M. parvus** Mercet (Silwood material)

Metaphycus taxi sp. n.

FEMALE.

Head : whitish-yellow with occiput dark brown ; lower clypeal margin brown ; frontovertex twice as long as wide, width (0·117 mm.) about half longitudinal diameter of eye ; eyes blackish-brown, longitudinal diameter over 4 times length of malar space (0·225: 0·054 mm.) ; ocelli reddish, base a little longer than side, mandible with lateral and middle teeth acute, mesal tooth broadly rounded ; 2 mandibular glands opening in interdental grooves ; maxillary and labial palps each 3-segmented.

Antennae (fig. 1) : distal two-thirds of radicle, dilated part of scape and club blackish ; remaining part of scape, apical third of pedicel, fifth and sixth funicle segments yellowish ; basal two-thirds of pedicel, funicle segments 1–4 dark brown ; scape a trifle less than 3·5 times longer than broad ; pedicel longer than 1–3 funicle segments combined ; sixth funicle segment longest and widest, segments 2–4 equal in length and shortest ; club (0·1 mm.) much shorter but wider than funicle, 1·5 times longer than wide, apex truncated ; first to third club segments with 3, 3, 5 sensoria respectively.

Thorax : pronotal middle region very dark brown, sides whitish with dark brown patch in dorsoposterior angles, anterior margin concave in the middle, posterior margin straight with 10 pairs of long setae ; entire mesotergum lemon-yellow, anterior margin of scutum brownish, basal half of tegulae whitish, apical half brown ; all sutures dark brown ; scutum and scutellum subequal in length, lateroposterior margin of scutellum brown ; pleura whitish with mesopleural margins brown ; sterna whitish-brown with median furrows and meso- and meta-pleurosternal sutures brown ; metanotum and propodeum blackish, striated ; propodeo-metapleural posterior margin very dark brown ; mesopostphragma short, brown with anterolateral angles blackish, apex broadly rounded and extending to second abdominal tergum.

Fore wings : speculum complete ; 12 short setae on submarginal vein ; costal cell long and narrow ; hyaline.

Hind wings : sessile ; hyaline ; narrowly rounded apex ; 3 short curved hooklets at apex of marginal vein.

Fore legs (fig. 3) *:* femora and tibiae expanded ; coxae, trochanters, femora, tibiae, tibial spur whitish-yellow with a faint incomplete transverse brown band on proximal third of tibiae ; base and apex of tibiae, fifth tarsal segment brown ; tarsal segments 1–4 yellowish ; 3 long setae on outer face of distal half of coxae ; 2 stout, thick setae close to base of the spur.

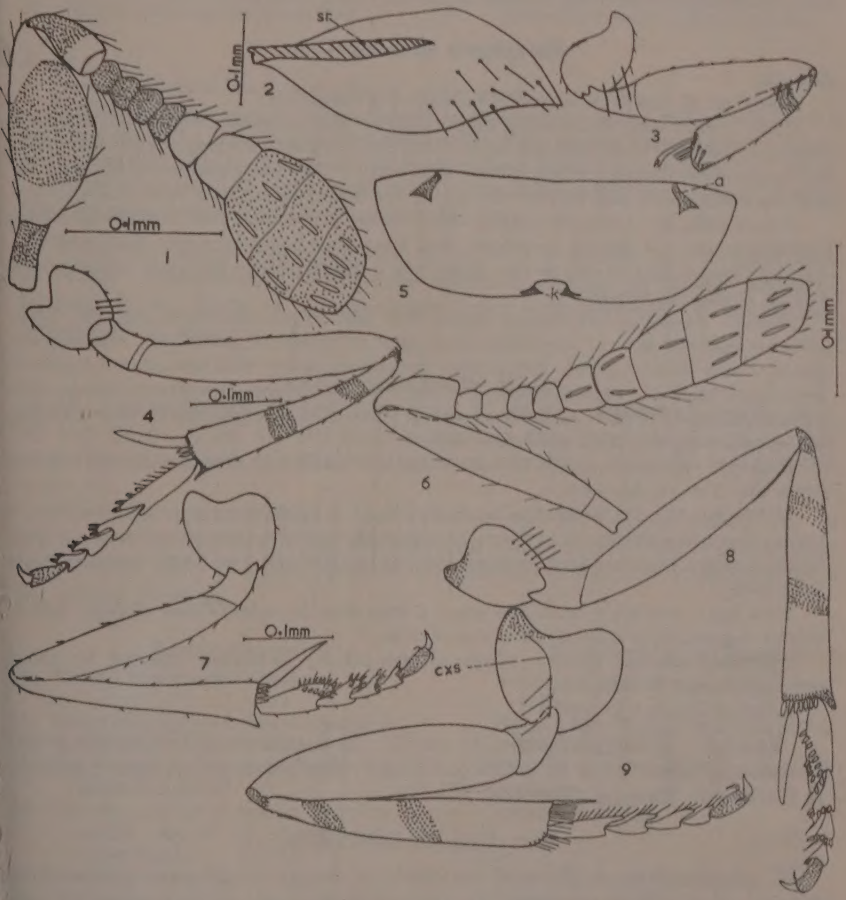
Middle legs (fig. 4) : yellowish ; a dark brown band on basal third, another on middle third of tibiae ; both ends of tibiae and fifth tarsal segment dark brown ; 3 long setae on outer face of distal half of coxae ; dorsal angle of distal rim of tibiae forming an angular extension, 2 short, stout pegs on distal rim ; tibial spur a little shorter than the basitarsus ;

2 convergent rows of 7 short pegs on ventral surface of basitarsus ; second tarsal segment with 4 pegs at apex ; third and fourth with 2 pegs each.

Hind legs : coloration as on middle legs except that second band of tibiae is faint ; femora dilated ; 2 long setae on anterior face of distal half of coxae ; 11 short, stout setae on distal rim of tibiae.

Abdomen : dark brown ; distal end broadly rounded ; subgenital plate covers only basal half of ovipositor ; latter with base lying in the fifth segment ; first valvifers triangular ; third valvulae immovably joined with second valvifers.

Length of female 1·28 mm.



FIGS. 1–9.—(1–5) *Metaphycus taxi* sp. n. (1) Antenna. (2) Outer plate of ovipositor. (3) Incomplete fore leg. (4) Middle leg. (5) Subgenital plate. (6–7) *M. eriococci* sp. n. (6) Antenna. (7) Middle leg. (8–9) *M. parvus* (Silwood material). (8) Middle leg. (9) Hind leg. (For key to lettering see page 465.)

MALE.

Resembles female except in the following characters:

Scape about 5 times longer than wide, yellowish with dilated region dark brown; funicle and club brown; segmentation of club not distinct; black bands on middle tibiae sharp; coloration of body as a whole bright; 5 short, stout pegs on ventral surface of middle basitarsus; abdomen subtriangular.

Material.—Holotype female reared 8.v.53; allotype male, 25 female and 5 male paratypes bred on different dates. Endoparasite of *Eulecanium taxi* Habib on *Taxus baccata* L. at Silwood Park. The holotype and allotype have been deposited in the British Museum (Nat. Hist.).

Metaphycus eriococci sp. n.

FEMALE.

Resembles *M. taxi* sp. n. except in the following characters:

Head: yellow with frontovertex bright yellow; eyes greenish, longitudinal diameter (0·24 mm.) 2·5 times width of frontovertex (0·093 mm.); malar space long, slightly more than half longitudinal diameter of eye (0·13 : 0·24 mm.); the orange-coloured ocelli form an isosceles triangle with base shorter than sides; the 3 mandibular teeth small and rounded.

Antennae (fig. 6): yellowish-brown; scape 9 times longer than wide (0·25 : 0·029 mm.); funicle segments 1–4 almost moniliform, first 2 segments equal in length, third shortest; club 2·5 times as long as wide (0·138 : 0·056 mm.), fifth funicle to third club segment with 1, 2, 3, 3 sensoria respectively.

Thorax: pronotum and tegulae yellow with dark brown patches in pronotal dorso-posterior angles, 9 pairs of long setae along posterior margin of pronotum; mesotergum, pleura, sterna bright yellow; metanotum, propodeum yellow with laterodorsal angles of metanotum blackish; scutum shorter but wider than scutellum; trans-scutal suture with a triangular brown patch in each lateral portion; fore wings stumpy, hyaline and extending to posterior margin of third abdominal tergum.

Fore legs: yellowish, except fifth tarsal segment which is dark brown; dorsal angle of tibiae with 2 short, stout setae.

Middle legs (fig. 7): coloration as on fore legs; 4 short, stout pegs on distal rim of tibiae; 2 convergent rows of 14 short, stout pegs on ventral surface of basitarsus; 6 pegs on apical region of second tarsal segment; 4 pegs on third and 3 on fourth tarsal segments respectively.

Hind legs: coloration as on fore legs; 3 long setae on anterior face of distal half of coxae; 9 short, stout setae on distal rim of tibiae.

Abdomen: dorsum yellow; venter whitish-yellow; ovipositor exserted by about one-eighth length of abdomen.

Length of female 1·12 mm.

Material.—Holotype female, 15.ix.53. Endoparasite of *Eriococcus greeni* Newst. on *Festuca rubra* L. at Silwood Park. The holotype has been deposited in the British Museum (Nat. Hist.).

Metaphycus zebratus Mercet.

M. zebratus Mercet (Silwood material) is clearly a different species from *M. taxi* sp. n. They are especially distinct in the new setal characters, as well as in the relative lengths and widths of frontovertex, malar space, etc.

The Silwood specimens run down rather well in Mercet's (1921) key to *Metaphycus zebratus* Merc. The latter is represented in the British Museum but differs in the following characters, which do not appear sufficient to make it a new species.

Silwood material.	*M. zebratus* Mercet.
(1) Vertex yellow with bluish spots.	Vertex yellowish-brown with basal ocelli placed in a distinct oval brownish patch.
(2) Face, malar space, lateral part of occiput whitish with bluish spots.	Face, malar space, lateral part of occiput yellowish.
(3) Scutum, scutellum yellow.	Scutum, scutellum yellow with light shade of brown.
(4) Pleura whitish with bluish spots.	Pleura whitish, no bluish spots.
(5) Triangular blackish patch on outer thirds of trans-scutal suture.	No such patch.
(6) Apex of abdomen whitish.	Apex of abdomen dark brown.
(7) *Ripersia hibernica* Newst. as host.	*Eriopeltis festucae* (Fonsc.) as host.

Male.

Resembles female except in the following characters :

Scape less dilated, whitish with dorsal and ventral margins black ; pedicel whitish with basal end blackish ; entire funicle and club brown ; lower clypeal margin brown ; scutum and axillae light yellow ; general coloration of the body lighter ; size smaller.

Length of female 1·36 mm.; *length* (*width*) scape 0·281 (0·086) mm.; *length* of malar space 0·1 mm.; *longitudinal diameter* of eye 0·247 mm.

Material.—Three females reared 24.ix.53 ; 1 female and 1 male bred 26.ix.53. Endoparasite of *Ripersia hibernica* Newst. on *Holcus mollis* at Silwood Park. Some of the specimens have been deposited in the British Museum (Nat. Hist.).

Metaphycus parvus Mercet.

M. parvus Mercet (Silwood material) is clearly a different species from *M. taxi* sp. n. They are especially distinct in their setal characters, as well as in the characters of relative lengths and widths of frontovertex, malar space, etc.

The Silwood material runs down rather well in Mercet's (1924) key to *M. parvus* Mercet, except for the following differences which do not appear sufficient to make it a new species. *M. parvus* Mercet is not represented in the British Museum.

Silwood material.	*Metaphycus parvus* Mercet.
(1) Vertex, face brownish-orange.	Vertex yellowish-brown, face whitish-yellow.
(2) Scape over 3·5 times longer than wide, and clearly longer than funicle.	Scape 3 times longer than wide and as long as funicle.
(3) Club clearly shorter than funicle segments 2–6 united.	Club as long as funicle segments 2–6 united.
(4) Lateral area of pronotum yellowish, middle region of dorsoposterior angles black.	Pronotum whitish.
(5) Mesotergum lemon-yellow.	Mesotergum yellowish-brown.
(6) Basitarsus of middle legs shorter than combined lengths of tarsal segments 2–3 (0·12 : 0·13 mm.) (fig. 8).	Basitarsus of middle legs a little longer than tarsal segments 2–3 united.
(7) Basal two-thirds of abdominal dorsum dark brown, apical third brownish-orange.	Abdominal dorsum blackish with sides whitish.
(8) *Eriopeltis festucae* (Fonsc.) as host.	Host not recorded by Mercet.

MALE.

Resembles female except in the following characters :

Scape, basal half of pedicel brown ; apical half of pedicel whitish ; funicle and club brown with apex of club whitish ; vertex, face light orange ; malar space, lower clypeal margin whitish ; tarsal segments 1–4 yellowish ; dorsum of abdomen orange with transverse brownish bands on basal terga ; venter whitish.

Length of female 1·36 mm.; *length* (*width*) scape 0·25 (0·07) mm.; *length* malar space 0·08 mm.; *longitudinal diameter* of eye 0·27 mm.

Material.—One female reared 25.ix.53 ; 5 females and 1 male bred on different dates. Endoparasite of *Eriopeltis festucae* (Fonsc.) on *Festuca rubra* L. at Silwood Park. One female and 1 male have been deposited in the British Museum (Nat. Hist.).

2. *Euaphycus* Mercet.

The genus *Euaphycus* Mercet is generally confused with *Metaphycus* Mercet. Recently Compère (1940) has questioned its generic status and advocated merging it with *Metaphycus* Mercet. Ferrière (1953*b*) retained the two as separate genera. A few new characters have been discovered to distinguish *Euaphycus* from *Metaphycus* as follows :

Hind coxae without coxal suture ; knobs on sides of the central notch of posterior margin of subgenital plate with laterally directed ridge (fig. 11, *k*, *r*) ; anterolateral apodemes of subgenital plate broad and anteriorly directed (*a*) ; major portion of mid-longitudinal area of outer plates of ovipositor greatly thickened (fig. 15, *tp*).

Euaphycus variolosus sp. n. resembles *E. aspidiotinorum* Compère, which is not represented in the British Museum, but it seems to be a new species as shown in the following key.

Key to E. variolosus sp. n. *and Allied Species Based on Females.*

1 Frontovertex about twice as long as wide ; spur of middle tibiae variable ; short, stout pegs on ventral surface of middle basitarsus 2

– Frontovertex slightly longer than wide ; spur of middle tibiae as long as basitarsus ; generally few or no pegs on ventral surface of middle basitarsus 3

2 Frontovertex less than twice as long as wide ; hairs of marginal fringe of fore wings widely spaced ; hairs of marginal fringe of hind wings longer than half width of disc ; exserted part of ovipositor as long as middle tibial spur . . . . . **E. aspidiotinorum** Compère

– Frontovertex 2·5 times longer than wide ; hairs of marginal fringe of fore wing moderately spaced ; hairs of marginal fringe of hind wings shorter than half width of disc ; exserted part of ovipositor slightly longer than half length of middle tibial spur ; 2 rows of 16 short, stout pegs on ventral surface of middle basitarsus ; 8 pairs of long setae along posterior margin of pronotum ; pedicel shorter than funicle segments 1–5 united . . . . . **E. variolosus** sp. n.

3 Malar space as long as longitudinal diameter of eye ; pedicel as long as funicle segments 1–3 combined ; hairs of marginal fringe of fore wings widely spaced ; ventral surface of middle basitarsus lacks short, stout pegs ; basitarsus as long as tarsal segments 2–3 combined ; ovipositor concealed . . . . **E. hederaceus** (Westw.)

– Malar space less than half longitudinal diameter of eye; pedicel longer than funicle segments 1–3 combined; hairs of marginal fringe of fore wings closely placed; 2 rows of 8 short, stout pegs on ventral surface of middle basitarsus, latter clearly shorter than tarsal segments 2–3 combined; exserted part of ovipositor less than length of middle tibial spur; 3 short, stout pegs on distal rim of middle tibiae; 7 pairs of long setae along posterior margin of pronotum . . . . . **E. callunae** sp. n.

Euaphycus variolosus sp. n.

FEMALE.

Head: bright yellow with light greenish reflections; occiput with a small black arc laterodorsal to foramen magnum; frontovertex narrow, 2·5 times longer than wide (0·31 : 0·12 mm.); eyes greenish, naked, longitudinal diameter slightly less than 1·75 times width of frontovertex, a little over twice length of malar space; ocelli partly reddish and partly yellowish, base of ocellar triangle equals distance of a basal ocellus from eye rim, and about twice the distance of basal ocellus from occipital margin; the 3 teeth of mandibles small, with narrowly rounded apices; 2 mandibular glands opening at outer and mesal teeth.

Antennae (fig. 10): scape yellowish-white with radicle and a little central area blackish, slightly under 5 times longer than wide; basal half of pedicel, funicle segments 1–3, first club segment and basal half of second blackish; apical half of pedicel whitish; funicle segments 5–6 and remaining part of club yellowish; pedicel shorter than funicle segments 1–5 combined; funicle segments 1–4 shorter and of same length, fifth and sixth of same length (0·026 mm.) and progressively increasing in width with sixth segment widest; club with broadly rounded apex, wider but clearly shorter than funicle.

Thorax: pronotum whitish with a small brown patch in the centre and a very small blackish patch in each dorsoposterior angle, 8 pairs of long setae along posterior margin; tegulae brown with a small basal area whitish; mesotergum bright yellow, all margins and sutures brown with anterior margin of scutum dark brown; scutellum a little longer than scutum; metanotum and propodeum dark brown and striated; pleura and sterna yellowish-white; mesopleura longitudinally striated; mesopostphragma dark brown with basal angles black-tipped, the short narrowly rounded apex extending to second abdominal tergum.

Fore wings: hyaline (sometimes brachypterous); stigmal vein short but longer than postmarginal vein; speculum interrupted in basal third by 2 transverse rows of setae; hairs of marginal fringe long (0·04 mm.) and spaced moderately apart (0·01 mm.); costal cell narrow.

Hind wings: hyaline; apex narrowly rounded; 3 curved hooklets at apex of marginal vein; width of wing two and one-third times greater than length of hair of marginal fringe (0·14 : 0·06 mm.).

Fore legs: coxae, trochanters, femora and tibiae yellowish-white with 2 narrow dark brown bands on basal two-thirds of tibiae; tarsal segments 1–4 yellow, fifth dark brown; femora and tibiae expanded; tibiae shorter than middle and hind tibiae; 3 long setae on anterior face of distal half of coxae.

Middle legs (fig. 12): coloration as in fore legs except that the 2 tibial bands are blackish on proximal and distal third respectively, and apex of tibiae also blackish; tibial spur shorter than basitarsus, latter slightly longer than combined lengths of second and third tarsal segments; no long setae on anterior face of distal half of coxae; no pegs on distal rim of tibiae; ventral surface of basitarsus with 2 outer convergent rows of 13 short, stout pegs and 1 middle row of 3 pegs (total 16); apex of each fourth segment has 2 pegs only, apex of second and third tarsal segments with a semicircle of 7 pegs each.

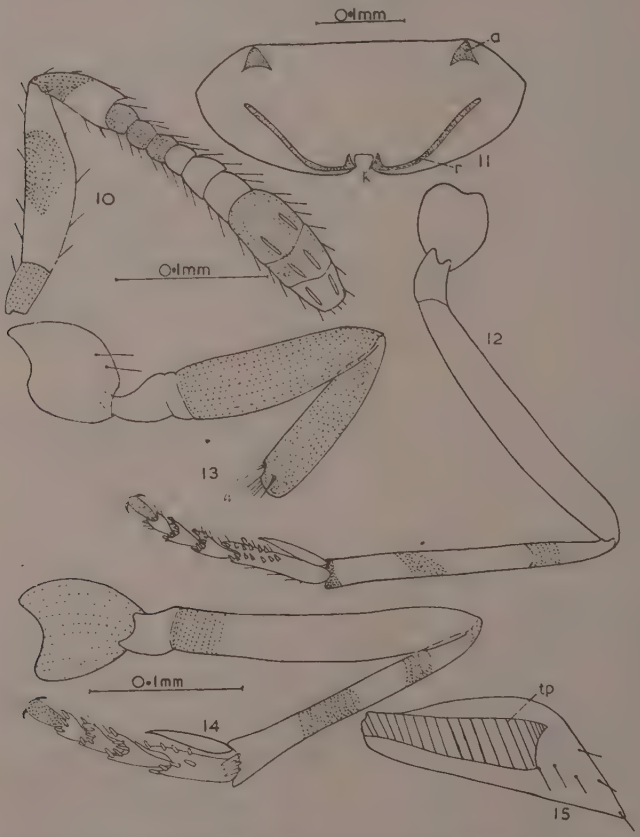
Hind legs: coloration as in middle legs; femora expanded; tibiae shorter than middle tibiae; 2 long setae on distal half of anterior face of coxae; 12 short, stout setae on distal margin of tibiae.

Abdomen : shorter but wider than thorax ; whitish-yellow ; exserted part of ovipositor slightly longer than half length of middle tibial spur (0·056 : 0·10 mm.), base lying in fifth segment ; first valvifers triangular, second with narrow submarginal ridge along dorsal margin ; third valvulae brown, conical, immovably joined with second valvifers and with dense long setae on apical half.

MALE.

Resembles female except in the following characters :

Basal half of scape whitish, apical half blackish ; proximal third of pedicel dark brown, distal two-thirds white ; funicle dark brown ; club entire with basal two-thirds dark brown ; apical third dirty white ; scape just over 4 times longer than wide ; pedicel less than twice as long as wide ; first funicle segment more than 1·25 times longer than wide ; club as long as funicle segments 3–6 combined ; metanotum and propodeum blackish ; 2 convergent rows of 9 short, stout pegs on ventral surface of middle basitarsus, 2 pegs on both second and third tarsal segments, 1 peg on fourth segment ; incomplete broad, transverse brown band along posterior margin of abdominal terga.



FIGS. 10–15.—(10–12) *Euaphycus variolosus* sp. n. (10) Antenna. (11) Subgenital plate. (12) Middle leg. (13–15) *E. callunae* sp. n. (13) Incomplete fore leg. (14) Middle leg. (15) Outer plate of ovipositor.

Material.—Holotype female reared, 25.v.53; 12 female paratypes, different dates. Allotype male bred 20.v.53; 2 male paratypes on different dates. Endoparasite of *Asterolecanium variolosum* (Ratzb.) on *Quercus robur* L. at Silwood Park. The holotype and a few paratypes have been deposited in the British Museum (Nat. Hist.).

The male of *E. variolosus* sp. n. also differs from that of *E. aspidiotinorum* Compère. This further confirms the specific identity of *E. variolosus*. The differences are as follows:

E. variolosus sp. n. ♂.	*E. aspidiotinorum* Compère. ♂
(1) Head bright yellow with a small black area round foramen magnum.	Face, frontovertex orange-yellow, malar space blackish posterior to genal suture.
(2) Basal half of scape whitish, distal half blackish; about 4 times as long as wide.	Scape whitish basally, grading to yellowish apically, with a faint dark suffusion distad of the middle; about 3 times as long as wide.
(3) First funicle segment about 1·25 times wider than long.	First funicle segment slightly wider than long.
(4) Club slightly over twice as long as wide and equals combined lengths of 3–6 funicle segments.	Club more than twice as long as wide and slightly longer than 3 preceding segments combined.
(5) Abdomen whitish-yellow with incomplete, broad, transverse brownish bands along posterior tergal margins.	Abdomen largely yellow with the basal third faintly suffused with dusky.

Euaphycus callunae sp. n.

FEMALE.

Resembles *E. variolosus* sp. n. except in the following characters:

Head: vertex, upper part of face orange, lower part of face yellowish; lower clypeal margin dark brown; a narrow dark brown transverse band between antennal sockets, another similar band between each antennal socket and the respective eye rim, these 3 bands together form a dark brown arc on lower part of face; malar space, hypostomal area and occiput very dark brown; frontovertex a little over 1·25 times longer than wide; eyes reddish-brown with ocular rim orange; ocelli reddish, base of ocellar triangle twice the distance of basal ocellus from eye rim, latter clearly over twice the distance of basal ocellus from occipital margin, which is a little over one-half the diameter of basal ocellus.

Antennae: scape yellowish with radicle dark brown and a similar coloured large patch on middle region; pedicel, except yellowish apex, and funicle segments 1–5 brown; sixth segment yellowish; first club segment dark brown, second brownish in proximal part, distal part of second segment and the third yellowish; scape less than 4·5 times its width; pedicel shorter than funicle segments 1–4 combined; club with narrowly rounded apex, as long as preceding 5 segments combined; club segments 1–3 with 1, 2, 1 sensoria respectively.

Thorax: posterior pronotal margin with 7 pairs of long setae, central dark brown patch broad; propleura and sternum very dark brown; meso- and metapleura and sterna brown; scutum, scutellum reticulate scaly; propodeum brown; meso-postphragma very short with narrowly rounded apex not extending beyond propodeum; fore wings with a brown patch on stigmal vein; narrow, usually long (sometimes brachypterous); hairs of marginal fringe moderately long and closely spaced (0·026–0·008 mm.); length of marginal fringe of hind wing about 0·75 times width of disc.

Fore legs (fig. 13): coxae, trochanters brownish-white; femora and tibiae dark brown with their bases brownish-white; 2 long setae on anterior face of distal half of coxae; 1 long and thick seta close to base of tibial spur.

Middle legs (fig. 14): coxae dark brown; trochanters, femora brownish-white with bases of femora dark brown; tibiae brownish-white with bases dark brown and a narrow dark brown band on basal and another on apical half; tibial spur as long as basitarsus; latter shorter than combined lengths of tarsal segments 2–3, 3 short, stout pegs on distal rim of tibiae; only 2 convergent rows of 8 short, stout pegs on ventral surface of basitarsus; each tarsal segment 2–3 with 5 pegs at apex, 3 pegs only on fourth segment.

Hind legs: coxae, trochanters and femora brownish-white with apical third of femora dark brown; colour of tibiae as of middle legs; no long setae on anterior face of distal half of coxae; 13 short, stout setae on distal rim of tibiae.

Abdomen: dorsum brown; venter yellowish-brown; ovipositor slightly exserted with the exserted part (0·03 mm.) less than one-half length of middle tibial spur (0·035 mm.): base of ovipositor lying in second segment.

Male.

Resembles female except in the following characters:

A brown patch on ocellar triangle; antennae dark brown except apex of pedicel, which is yellowish; scape a little less than 4·5 times its width; pedicel 1·75 times longer than wide, shorter than funicle segments 1–3 combined; second funicle segment as long as fifth segment; club entire, shorter than preceding 4 segments united (0·073 : 0·077 mm.).

Measurements of female:

Length 0·86 mm., *length* of malar space 0·075 mm., *longitudinal diameter* of eye 0·15 mm.; *length* of pedicel (funicle segments 1–4 united) 0·06 (0·08) mm.; tarsal segments 2–3 of middle leg united 0·08 mm.

Material.—Holotype female reared 7.viii.53, 1 female paratype, 8.viii.53. Allotype male bred 7.vii.53, 5 male paratypes on different dates. Endoparasite of *Diaspidiotus bavaricus* Lindinger on *Calluna vulgaris* (L.) Hull at Silwood Park. The holotype and allotype have been deposited in the British Museum (Nat. Hist.).

Euaphycus callunae sp.n. closely resembles *E. hederaceus* (Westwood), which is represented in the British Museum, but differs as already shown. The males of the two species differ as follows:

	E. callunae sp. n. ♂.	*E. hederaceus* (Westwood) ♂.
(1)	Scape dark brown.	Scape white with brown on dorsal and ventral margins.
(2)	Pedicel dark brown with yellowish apex.	Pedicel brown basally and whitish apically.
(3)	Funicle and club dark brown.	Funicle and club yellowish-brown with apex of club whitish.
(4)	Club shorter than combined lengths of preceding 4 segments.	Club as long as 5 preceding segments united.
(5)	*Diaspidiotus bavaricus* Lindinger as host.	*Aspidiotus hederas* (Vallot) as host.

3. *Aphycus* Mayr.

This genus generally includes *Waterstonia* Mercet. The latter was declared by Mercet (1921) to be a synonym of the former. Later (1925), he revived it and put it very close to *Aphycus* Mayr. Ferrière (1953*b*) followed this in his key to genera. According to this key *Aphycus antennalis* sp. n. would not run to *Aphycus* because of its antennal colour. At the same time, on the basis of the structural characters given by Mercet (1925) (*viz.* funicle segments generally transverse; club longer than funicle; labial palps 2-segmented; fore wings smoky in the middle), *A. antennalis* would come in *Aphycus* rather

than in *Waterstonia*, of which the narrow frontovertex, as given by Ferrière, also prevents the inclusion of *A. antennalis* sp. n. there. I have not been able to see an example of a species placed in *Waterstonia* but from the drawing of *Aphycus apicalis* Mercet non Dalman, made by G. Ceballos and published by Mercet (1921 : 229), it appears that this species has a crescent-shaped head as distinct from the shape normal in species of *Aphycus sensu stricto* and of *A. antennalis*. For these reasons I place *A. antennalis* in *Aphycus* Mayr, and not in *Waterstonia*. The key character of the antennal coloration which, no doubt, was convenient and easy to use for known European species, breaks down or at least requires modification.

The following new generic characters have been discovered in the two species of *Aphycus* reared by the present writer :

Anterior pronotal margin not deeply concave in the middle (fig. 18) ; hind coxae with distinct coxal suture (fig. 20, *cxs*) ; knobs on sides of central notch of posterior margin of subgenital plate followed by meso-anteriorly directed ridges (fig. 23, *r*) ; outer plate of ovipositor uniformly broad (fig. 22, *A*) ; first valvifers semicircular (fig. 22, *C*).

There is only one species recorded in the genus *Aphycus* Mayr *s.s.*, viz. *Aphycus apicalis* Dalman, which is represented in the British Museum. The two species bred, *A. antennalis* sp. n. and *A. brachypterus* sp. n., differ from it. These new species have a common host. This, apparently, suggests that *A. brachypterus* is merely a brachypterous form of *A. antennalis*, but they show marked differences and are distinct enough to be regarded as separate species. The following key is proposed for the three species of the genus.

Key to Species of Aphycus *Based on Females.*

1 Pedicel longer than combined lengths of funicle segments 1–4 ; funicle dark brown ; scutum with traces of parapsidal suture ; abdomen longer than thorax 2

– Head yellowish-orange ; pedicel shorter than funicle segments 1–4 combined ; basal segments of funicle brown, distal segments white ; scutum entire ; tegulae whitish ; legs white with brown patch on posterior tibiae ; abdomen brown ; ovipositor exserted to one-third length of abdomen . . . . . **A. apicalis** Dalman

2 Frontovertex and face yellowish ; occiput and malar space yellowish-brown ; funicle segments 1–3 of unequal length ; tegulae yellowish ; 8 pairs of long setae on posterior pronotal margin ; wings rudimentary ; 6 short, stout pegs on distal rim of middle tibiae ; ovipositor exserted to one-eighth length of abdomen **A. brachypterus** sp. n.

– Head yellowish-orange ; funicle segments 1–3 of equal length ; tegulae dark brown ; 11 pairs of long setae on posterior pronotal margin ; wings well developed ; 7 short, stout pegs on distal rim of middle tibiae ; ovipositor exserted to about one-fifth length of abdomen **A. antennalis** sp. n.

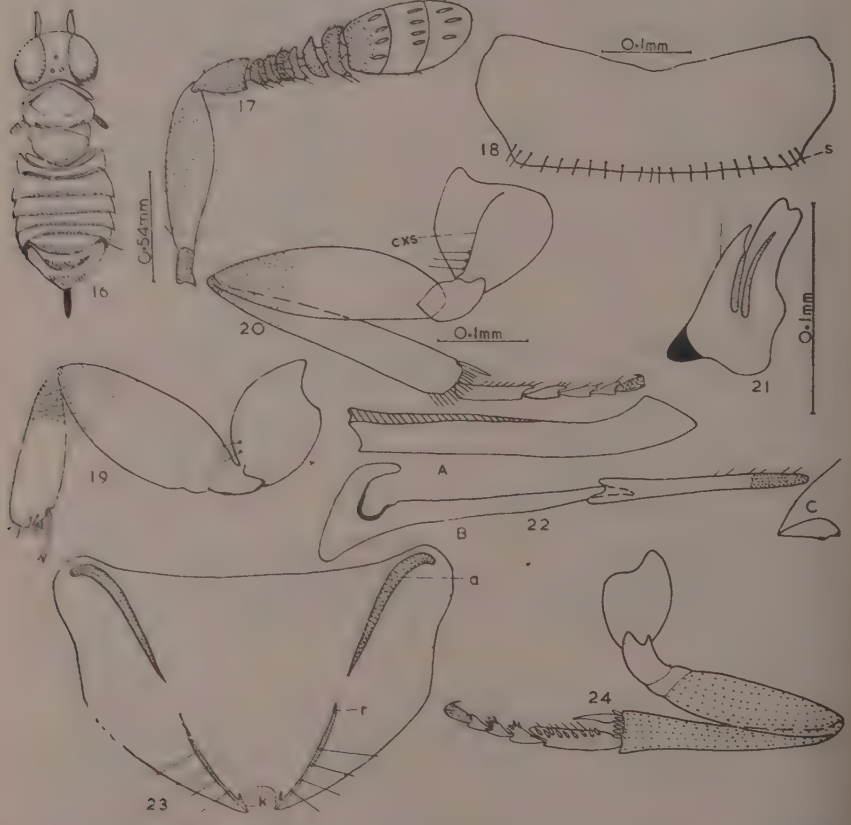
Aphycus antennalis sp. n.

FEMALE.

Head (fig. 16) : shagreened ; yellowish-orange with a narrow black ring round foramen magnum ; lower clypeal margin dark brown ; frontovertex moderately broad, about 1·75

times as long as wide ; eyes naked, posterior part of ocular rim black, longitudinal diameter about 1·75 times width of frontovertex, and about 2·75 times longer than malar space; ocelli orange, the basal one removed by 1·25 times its diameter from eye rim, and 3·25 times from occipital margin ; mandibles (fig. 21) with the central one of the three teeth longest, outer tooth shortest and pointed ; 2 mandibular glands opening in interdental grooves, inner margin of mandibles projecting near the base.

Antennae (fig. 17) : scape yellow except radicle and broad band along dorsal margin, which are dark brown ; pedicel, funicle, base of club dark brown ; remaining part of club yellowish ; scape slightly less than 4 times longer than wide, longer than combined lengths of pedicel and funicle ; pedicel longer than funicle segments 1–4 combined (0·09 : 0·07 mm.) ; all funicle segments strongly transverse, funcile segments 1–3 of the same length, fourth segment shortest, sixth longest ; club hardly truncated at apex, longer than funicle, also wider than it, and shorter than scape ; club segments 1–3 with 4, 4, 3 sensoria respectively.



Figs. 16–24.—(16–23) *Aphycus antennalis* sp. n. (16) Entire female without appendages. (17) Antenna. (18) Pronotum. (19) Incomplete fore leg. (20) Hind leg. (21) Mandible. (22) Outer plate of ovipositor (*A*), second valvifer (*B*) and first valvifer (*C*). (23) Subgenital plate. (24) *A. brachypterus* sp. n. Middle leg.

Thorax (fig. 16): pronotum dirty white, visible, with 11 pairs of long setae along posterior margin (fig. 18, *s*); tegulae dark brown; mesotergum, pleura and sterna yellowish with median grooves and anterior margins of sterna and pleurosternal sutures blackish; occipital processes, pleural wing processes of mesopleura and moderately broad band along anterior margin of scutum blackish; all margins of mesothoracic segment, traces of parapsidal sutures and other sutures dark brown; trans-scutal fissure with a triangular blackish patch near each outer end; metanotum brownish, faintly striated; propodeum brown and smooth; meso-postphragma short, dark brown and extending to third abdominal tergum.

Fore wings: extending beyond apex of ovipositor with a dark brown patch extending from stigmal vein to somewhat beyond middle of wing; moderately broad; speculum curved, incomplete and interrupted in the middle by a transverse row of setae; costal cell broad.

Hind wings: hyaline; apex narrowly rounded; 6 short curved hooklets at apex of marginal vein.

Fore legs (fig. 19): coxae, trochanters, femora, tibiae and tarsal segments 1–4 yellowish with apical third of femora and basal quarter of tibiae brown; fifth tarsal segment dark brown; 2 long setae on anterior face of distal half of coxae; 2 short, thick setae in dorsal angle of distal half of coxae; 2 short, thick setae in dorsal angle of distal rim of tibiae and another 2 near base of spur.

Middle legs: coloration as in fore legs except that basal two-thirds of tibiae brownish; 4 long setae on anterior face of distal half of coxae; 7 short, stout pegs along distal rim of tibiae; tibial spur yellowish and shorter than basitarsus, latter longer than tarsl segments 2–3 combined; ventral surface of basitarsus with 2 rows of 18 short, stout pegs; 5 pegs at apex of both second and third segments, only 2 pegs on fourth segment.

Abdomen (fig. 16): dorsum yellowish with a broad, incomplete transverse dark brown band along posterior margin of each tergum; anterior margin of second tergum blackish; apex of abdomen yellowish; venter brownish-yellow; ovipositor exserted to about one-fifth length of abdomen (0·12: 0·65 mm.); base of ovipositor lying in second segment; anterolateral apodemes of subgenital plate resemble long oblique ridges (fig. 23, *a*); second valvifers narrow; third valvulae brownish-yellow tipped with dark brown and movably joined with second valvifers (fig. 22*B*).

Length of female 1·61 mm.

Material.—Holotype female reared 21.ix.53; 8 female paratypes reared 24.ix.53. Endoparasite of *Ripersia hibernica* (Newst.) on *Festuca rubra* L. at Silwood Park. The holotype has been deposited in the British Museum (Nat. Hist.).

Aphycus brachypterus sp. n.

FEMALE.

Differs from *Aphycus antennalis* sp. n. in the following points:

Head: frontovertex and face yellowish; occiput and malar space yellowish-brown; frontovertex about 1·5 times as long as broad; posterior part of ocular rim dark brown, longitudinal diameter of eye twice as long as width of frontovertex, and slightly less than 3 times length of malar space; antennae with basal third of scape yellowish-white, rest of scape dark brown, scape 4·5 times longer than wide; second funicle segment shortest, third and fifth of the same length; club segments 1–3 with 3, 1, 3, sensoria respectively.

Thorax: tegulae yellowish; 8 pairs of long setae along posterior margin of pronotum; meso-postphragma short and hardly extending to propodeum; wings rudimentary extending to propodeum.

Fore legs: femora, tibiae brown with base of femora and apical third of tibiae yellowish; no short thick sete near base of spur.

Middle legs (fig. 24) : femora, tibiae and tibial spur brown with base of femora yellowish ; no long setae on anterior face of distal half of coxae ; 6 short, stout pegs along distal rim of tibiae ; ventral surface of basitarsus with 2 outer rows of 14 short, stout pegs and 1 inner row of 3 pegs (total 17) ; second and third tarsal segments each with 4 pegs.

Hind legs : coloration as on fore legs ; 2 long setae on anterior face of distal half of coxae ; 12 short, stout setae on distal rim of tibiae.

Abdomen : transverse brownish band along each posterior tergal margin complete ; anterior margin of second tergum brownish ; ovipositor exserted to one-eighth length of abdomen (0·06 : 0·48 mm.), base of ovipositor lying in sixth segment ; third valvulae yellowish tipped with dark brown.

Male.

Resembles female except in the following characters :

Face brownish orange ; no dark brown band round foramen magnum ; basal half of scape yellowish, apical half dark brown ; pedicel brownish ; club entire ; basitarsus of middle leg longer than the tibial spur by one-third ; proximal half of abdomen brownish-yellow, distal half light orange, no brown bands along posterior margin of terga.

Length of female 1·0 mm.; pedicel (funicle segments 1–4 united) 0·07 (0·06) mm.

Material.—Holotype female reared 7.ix.53 ; 60 female paratypes on different dates. Allotype male and 70 male paratypes bred on different dates. Endoparasite of *Ripersia hibernica* (Newst.) on *Festuca rubra* L. at Silwood Park. The holotype, allotype and a few paratypes have been deposited in the British Museum (Nat. Hist.).

4. *Apterencyrtus* Ashmead.

Gahan (1951) declared *Chiloneurinus* Mercet to be a synonym of *Apterencyrtus* Ashmead. Very recently, Ferrière (1953*b*) accepted this view and gave the following characters for the genus :

Segments of funicle broader than long ; club not or slightly shorter than funicle ; mandibles tridentate ; wings hyaline ; submarginal vein a little curved in distal third ; marginal vein not or somewhat longer than stigmal vein.

Some of these characters are not shown by *Apterencyrtus thomsoniscae* sp. n. and *A. zonatus* sp. n. This suggests splitting the genus into two subgenera and the following key is proposed.

Key to Subgenera of Apterencyrtus *Based on Females.*

1 All segments of funicle wider than long ; mandibles tridentate ; marginal vein not or somewhat longer than stigmal vein
Apterencyrtus Ashmead subgen. n. Type *A. microphagus* Mayr

– First funicle segment as long as wide ; mandibles with 2 teeth and 1 truncation ; marginal vein clearly longer than stigmal vein
Richardsius subgen. n. Type *A. thomsoniscae* sp. n.

A few new characters have been discovered which suggest that *Apterencyrtus* Ashmead may have to be separated from *Chiloneurus* Mercet (*see below*, p.441).

So far only one species, *A. microphagus* Mayr, has been recorded and it is represented in the British Museum. The present writer has reared two new species and the following key is prepared to include all three species.

Key to Species of Apterencyrtus *Based on Females.*

1 Frontovertex a little longer than wide, width much greater than length of pedicel; scape clearly longer than funicle; marginal vein clearly longer than stigmal vein 2

– Frontovertex shagreened, much longer than broad, width not greater than length of pedicel; scape and funicle of the same length **A. microphagus** Mayr

2 Scape and basal half of pedicel dark brown, apical half of pedicel yellowish; scape about 4 times as long as wide; posterior pronotal margin with 9 pairs of long setae; fore femora whitish with a large dark brown patch on apical half; fore tibiae whitish with a dark brown patch on basal third; no stout setae near base of fore tibial spur; 5 short, stout pegs on distal rim of middle tibiae; basitarsus of middle tarsi longer than combined lengths of tarsal segments 2 and 3 . . . . . **A. zonatus** sp. n.

– Apex of scape yellowish; pedicel dark brown; scape about 5 times as long as wide; posterior pronotal margin with 8 pairs of long setae; fore femora, except trochantellus and apex, dark brown; fore tibiae dark brown except base and apex; 1 stout seta near base of fore tibial spur; 3 short, stout pegs on distal rim of middle tibiae; basitarsus of middle tarsi shorter than combined lengths of segments 2 and 3 . . . . . **A. thomsoniscae** sp. n.

Apterencyrtus (Richardsius) thomsoniscae sp. n.

FEMALE.

Head: black with bluish reflections; frontovertex moderately broad, longer than wide by one-third (0·13 : 0·01 mm.); eyes naked, longitudinal diameter a little greater than width of frontovertex, latter much greater than length of pedicel (0·1 : 0·05 mm.); malar space as long as longitudinal diameter of eye; ocelli dark brown, a basal ocellus removed by 3 times its diameter from eye rim, still more removed from occipital margin; mandibular apex broad with 2 short teeth with rounded apices and 1 truncation, 2 mandibular glands opening in the interdental grooves; maxillary palps 1-segmented, one long stout seta near base of palps; labial palps thick, 3-segmental, a pair of long stout setae near base of glossa.

Antennae (fig. 25): scape, except apex, pedicel, funicle segments 1–4, club dark brown; apex of scape, funicle segments 5–6 yellowish; scape about 5 times as long as wide (0·16 : 0·03 mm.), longer than funicle, first funicle segment as long as wide (0·02 mm.), second shortest, sixth longest; club with 3 conical, thick pegs at apex, club segments 1–3 with 3, 3, 3 sensoria respectively.

Thorax: blackish; dorsum reticulate scaly with thick setae; pleura and sterna finely reticulate; 8 pairs of long setae on posterior margin of pronotum (fig. 26, a); each axilla with only 1 seta; apical half of scutellum with a cluster of 11 long scale-like setae; meso-postphragma extending to second abdominal tergum.

Fore wings: extending beyond apex of abdomen; speculum uninterrupted; costal cell narrow and complete; 7 long setae on submarginal vein, middle third of submarginal vein colourless; marginal vein over 1·5 times length of stigmal vein (0·06 : 0·04 mm.), also longer than combined lengths of post-marginal and stigmal veins.

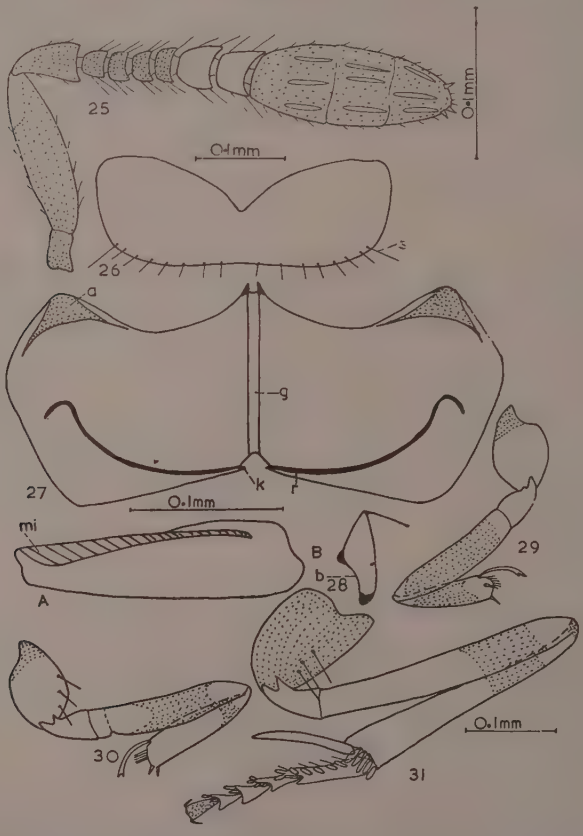
Hind wings: apex narrowly rounded; length of hair of fringe equals one-fifth width of wing; 3 long hooklets at apex of marginal vein.

Fore legs (fig. 29): proximal tip of coxae, femora except trochantellus and apex, tibiae except base and apex, and fifth tarsal segment dark brown; remaining part of coxae, trochanters, trochantellus, femoral apex, both ends of tibiae, tibial spur, and tarsal segments 1–4 whitish-yellow; femora and tibiae slightly expanded; 1 stout seta near base of spur and another in dorsal angle of distal rim of tibiae.

Middle legs : coxae and fifth tarsal segments dark brown ; trochanters, femora, tibiae, tibial spur and tarsal segments 1–4 whitish-yellow with a dark brown patch on apical third of femora and a similar patch on basal third of tibiae ; base of tibiae also dark brown ; tibial spur about 3 times the length of exserted portion of ovipositor ; basitarsus a little shorter than combined lengths of tarsal segments 2–3 (0·093 ; 0·096 mm.) ; 3 short stout pegs on distal rim of tibiae ; 2 rows of 10 short, stout pegs on ventral surface of basitarsus ; 2 similar pegs at apex of each of second and third tarsal segments.

Hind legs : coxae, femora except trochantellus, tibiae except basal end and apical quarter, and fifth tarsal segment dark brown ; trochanters, trochantellus and remaining parts of tibiae and tarsi whitish-yellow ; femora and tibiae slightly expanded ; 3 long setae on anterior face of distal half of coxae ; 8 short, stout setae on distal rim of tibiae.

Abdomen : dark brown with bluish reflections ; anterior and posterior margins of subgenital plate notched in the middle, the 2 notches connected by a mid-longitudinal groove (fig. 27, *g*), posterior notch with knobs at sides (*k*), anterolateral angles with thick triangular apodemes (*a*) ; ovipositor thick, exserted to about one-fifth length of abdomen,



Figs. 25–31—(25–29) *Apterencyrtus thomsoniscae* sp. n. (25) Antenna. (26) Pronotum. (27) Subgenital plate. (28) Outer plate of ovipositor (*A*) and first valvifer (*B*). (29) Incomplete fore leg. (30–31) *A. zonatus* sp. n. (30) Incomplete fore leg. (31) Middle leg.

base lying in third segment; outer plates of ovipositor with distinct marginal inflection along proximal half of dorsal margin (fig. 28*A*, *mi*) which in distal half becomes submarginal and narrow; first valvifers triangular with curved base (fig. 28*B*, *b*).

Length of female 1·09 mm.; pedicel (funicle) 0·053 (0·14) mm.

Material.—Holotype female reared 26.vi.53; 5 female paratypes bred on different dates. Hyperparasite of *Thomsonisca britannica* sp. n. which is an endoparasite of *Chionaspis salicis* (L.) on *Tilia sp.* at Silwood Park. The holotype has been deposited in the British Museum (Nat. Hist.).

Apterencyrtus zonatus sp. n.

Female.

Resembles *Apterencyrtus thomsoniscae* sp. n. except in the following characters:

Head: frontovertex with greenish reflections which become bluish on the face and malar space; frontovertex slightly longer than wide (0·11 : 0·1 mm.); longitudinal diameter of eyes about 1·5 times width of frontovertex; malar space slightly shorter than longitudinal diameter of eye; ocelli orange, basal ocellus removed by 3 times its diameter both from eye rim and occipital margin; entire scape, basal half of pedicel dark brown; apical half of pedicel yellowish; scape about 4 times longer than wide (0·17 : 0·04 mm.); club segments 1–3 with 2, 3, 2 sensoria respectively.

Thorax: dorsum black with greenish reflections; tegulae, pleura and sterna dark brown; posterior pronotal margin with 9 pairs of long setae; scutellum with a cluster of 16 scale-like setae on apical half; submarginal vein of fore wings with 6 long and 8 short setae; marginal vein slightly shorter than combined lengths of postmarginal and stigmal veins.

Fore legs (fig. 30): coxae and trochanters whitish with articular region of coxae dark brown; femora, whitish with a large dark brown patch on apical-half; another small patch on basal third of tibiae; 3 long setae on outer face of coxae; 2 short, stout setae in dorsal angle of distal rim of tibiae.

Middle legs (fig. 31): 5 short, stout pegs on distal rim of tibiae; two convergent rows of 12 short, stout pegs on ventral surface of basitarsus; 5 pegs at apex of second tarsal segment; 2 pegs on both third and fourth segments; basitarsus a little longer than combined lengths of tarsal segments 2 and 3.

Hind legs: trochantellus and apex of femora whitish; 9 short, stout setae on distal rim of tibiae.

Abdomen: dark brown with greenish, yellowish and crimson reflections; ovipositor exserted to about one-seventh length of abdomen.

Length of female 1·11 mm.; pedicel (funicle) 0·66 (0·156) mm.; marginal (stigmal) vein 0·07 (0·05) mm.

Material.—Holotype female reared 10.viii.53 from *Quadraspidiotus zonatus* (Frauenfeld) on *Quercus robur* L. at Silwood Park. It has been deposited in the British Museum (Nat. Hist.).

5. *Chiloneurus* Westwood.

The separation of this genus from the closely allied genus *Apterencyrtus* Ashmead is further strengthened by the following new characters:

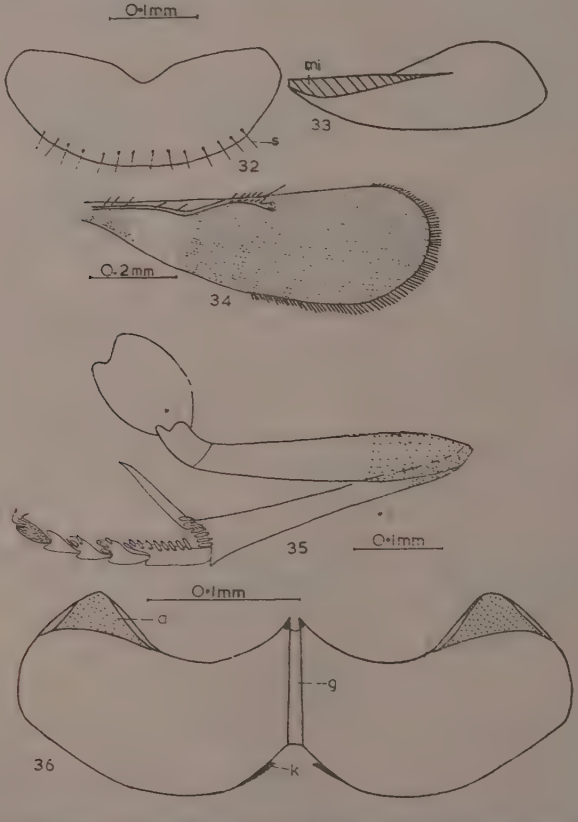
Pronotum with the middle region not narrow (*cf.* figs. 26 and 32); subgenital plate narrow with a wide notch in posterior margin, and knobs (*cf.* figs. 27, *r* and 36 *k*) on sides of notch not followed by laterally directed ridges; apical half of outer plates of ovipositor clearly much wider than basal half (*cf.* figs. 28*A* and 33).

Chiloneurus eriococci sp. n.

Female.

Head : blackish with slight bluish and crimson reflections ; lower clypeal margin yellowish-brown ; frontovertex more than 1·5 times longer than wide, width a little greater than length of pedicel ; eyes pubescent, longitudinal diameter about 2·75 times width of frontovertex ; former a little over twice length of malar space ; ocelli orange, basal ocellus separated by three-quarters its diameter from eye rim and by 2·5 times its diameter from occipital margin ; scrobes semicircular, deeply impressed, prominence between antennal sockets slightly less wide than frontovertex (0·08 : 0·09 mm.) but more than twice diameter of antennal socket ; mandibles tridentate with rounded apices, 2 mandibular glands opening on interdental grooves ; maxillary palps 4-segmented, first 2 segments whitish, rest dark brown, 1 long and stout seta lateral to base of palps ; labial palps thick, 3-segmented, a pair of long setae near base of palps.

Antennae : basal three-quarters of scape, pedicel, funicle segments 1 and 4–6 and club black ; apical quarter of scape, funicle segments 2–3 whitish (sometimes segments 1–3, or 2–4 white) : scape slightly dilated, about 5 times longer than wide, longer than funicle ; second and third funicle segments shortest and of same length, fourth as long as wide ;



Figs. 32–36.—*Chiloneurus eriococci* sp. n. (32) Pronotum. (33) Outer pate of ovipositor. (34) Fore wing. (35) Middle leg. (36) Subgenital plate.

club longer than combined length of preceding 4 segments ; apex narrowly rounded ; fifth funicle to third club segments with 1, 2, 2, 3, 1 sensoria respectively.

Thorax : pronotum more or less uniformly broad with anterior margin slightly notched in the middle, while the lateroposterior margin is convex, middle region and lateral marginal area black, rest yellowish-brown, 7 pairs of long setae along posterior margin (fig. 32, *s*) ; scutum, apical third of scutellum, metanotum, propodeum, pleura and sterna black, with bluish, crimson and yellowish reflections ; tegulae, axillae, and basal two-thirds of scutellum yellowish-brown ; entire thorax reticulate-scaly and with thick setae, except metanotum and propodeum which are striated and non-setose ; apical half of scutellum with a cluster of 16 long scale-like black setae ; meso-postphragma short, not extending beyond propodeum.

Fore wings (fig. 34) : hyaline except an oblique brown patch in basal angle ; disc setose, basal area non-setose ; 5 long brown setae on submarginal vein ; marginal vein clearly longer than combined lengths of postmarginal and stigmal veins (0·1 : 0·065 mm.).

Hind wings : hyaline ; apex broadly rounded ; 3 long curved hooklets at apex of marginal vein.

Fore legs : coxae, trochanters and femora yellowish-white except femoral apex which is yellowish-brown ; tibiae and tarsal segments 1–4 yellowish-brown ; fifth tarsal segment dark brown ; 3 long setae on outer face of distal half of coxae ; 2 short, thick setae near dorsal angle of distal rim of tibiae and 1 seta slightly mesal to them.

Middle legs (fig. 35) : coxae, trochanters and proximal two-thirds of femora yellowish ; distal third of femora, basal quarter of tibiae and fifth tarsal segment dark brown ; remaining part of tibiae, tibial spur and tarsal segments 1–4 yellowish-brown ; spur longer than basitarsus ; latter shorter than combined lengths of tarsal segments 2–3 ; 7 short, stout pegs on distal rim of tibiae ; 2 convergent rows of 17 short, stout pegs on ventral surface of basitarsus ; 5 and 4 similar pegs on apex of second and third tarsal segments respectively.

Hind legs : coxae, trochanters and basal end of femora yellowish ; rest of femora blackish ; tibiae blackish with basal tip and apical third yellowish-brown ; 3 long setae on anterior face of distal half of coxae ; 10 short, stout setae on distal rim of tibiae.

Abdomen : black with bluish, crimson and yellowish reflections ; exserted portion of ovipositor about five-sixths of middle tibial spur, base lying in third segment ; subgenital plate (fig. 36) covering basal half of ovipositor, notches in anterior and posterior margins connected by a mid-longitudinal groove (*g*), anterolateral angles with thick triangular apodeme (*a*) ; distinct marginal inflection along basal half of outer plates of the ovipositor (fig. 33, *mi*).

Length of female 1·45 mm.

Male.

Resembles female except in the following characters :

Black with bluish reflections ; antennae long, dark brown ; pedicel less than half length of first funicle segment ; funicle segments cylindrical, much longer than broad with long setae in whorls ; first funicle segment longest, sixth shortest ; club entire, conical, shorter than combined lengths of preceding 2 segments ; fourth funicle segments to club with 1, 3, 1, 4, sensoria respectively ; antennal insertion well removed from lower clypeal margin ; scutellum without tuft of scale-like setae ; distal rim of middle tibiae with only 6 short, stout pegs ; basitarsal ventral face with 13 short, stout pegs, third tarsal segment with 3 pegs.

Material.—Holotype female reared 31.viii.53 ; 1 allotype male bred 8.ix.53 ; 4 female, 9 male paratypes on different dates. Endoparasite of *Eriococcus greeni* Newst. on *Festuca rubra* L. at Silwood Park. The holotype and allotype have been deposited in the British Museum (Nat. Hist.).

This species comes close to *C. formosus* (Boheman) which is represented in the British Museum but it seems to be a new species with the following differences :

	C. eriococci sp. n.	*C. formosus* (Boheman).
(1)	Distance between antennal sockets less than width of frontovertex.	Distance between antennal sockets much greater than width of frontovertex.
(2)	Scape slightly dilated.	Scape strongly dilated
(3)	Second and third funicle segments white.	Three to five funicle segments white.
(4)	Club narrowly rounded at apex.	Club obliquely truncated at apex.
(5)	Tegulae yellowish-brown.	Tegulae dark brown.
(6)	Axillae yellowish-brown.	Apical half of axillae blackish.
(7)	Oblique brown patch in basal area of fore wings.	Entire basal area of fore wings hyaline.
(8)	Apical third of middle femora dark brown.	Entire middle femora yellowish.
(9)	Basal quarter of middle tibiae dark brown.	Entire middle tibiae yellowish.
(10)	Fifth tarsal segment of middle and hind tarsi dark brown.	Fifth segment of middle and hind tarsi yellowish.
(11)	*Eriococcus greeni* as host.	*Kermes bacciformis* Leon as host.

6. *Xanthoencyrtus* Ashmead.

Ferrière (1953*b*) declared the genus *Pholidoceras* Mercet to be a synonym of *Xanthoencyrtus* Ashmead. He (1953*a*) published a short but useful note on the female of *Pholidoceras semiaptera* Mercet and re-named it " *Xanthoencyrtus semiapterus* (Mercet) " on the basis of material collected from Silwood Park and sent to him by Professor O. W. Richards of the Imperial College, London. The present writer also collected the same species from the same locality. A detailed account of the female is given.

A few new generic characters are recorded :

Pronotum greatly constricted in the middle (fig. 41) ; subgenital plate with broadly rounded posterior margin (fig. 39) ; outer plates of ovipositor more or less uniformly broad (fig. 40*A*) ; second valvifers short and moderately broad ; third valvulae imperceptible (fig. 40*B*, *p*).

Xanthoencyrtus semiapterus (Mercet).

FEMALE.

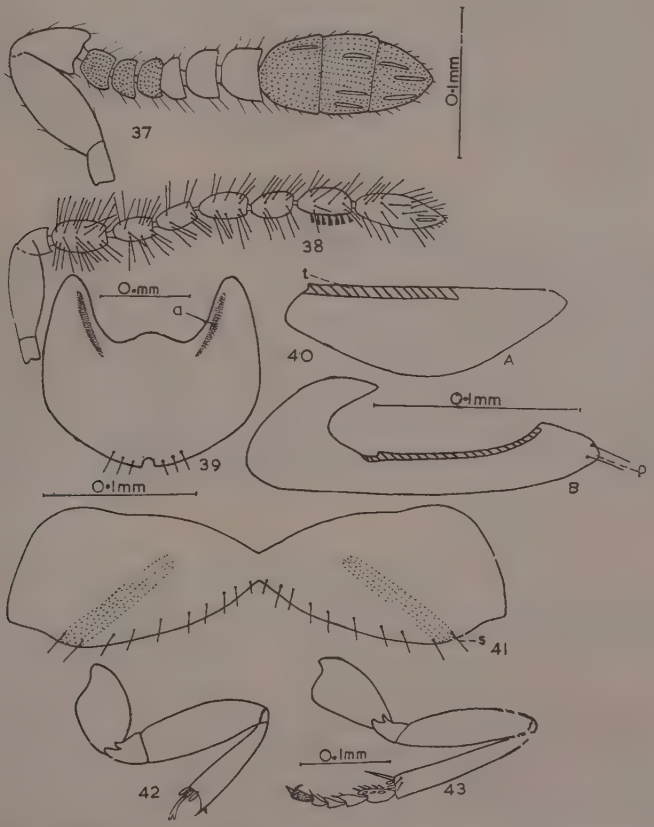
Head : prognathous type ; suboval ; dorsoventrally flattened ; faintly reticulate and sparingly setose ; face, vertex, and occiput yellow with a dark brown spot between basal ocelli and eye rim ; malar space yellowish with slightly brownish area near antennal sockets ; width of frontovertex slightly greater than longitudinal diameter of eye ; eyes blackish, sparingly pubescent, ocular rim brown with an orange spot on its anterior portion, another on middle and still another on posterior portion ; malar space half as long as longitudinal diameter of eye ; basal ocellus removed by 2·5 times its diameter from eye rim and by about one-third of its diameter from occipital margin ; mandibular apex narrow and bi-dentate, each tooth receiving a mandibular gland ; maxillary palps 3-segmented ; labial palps 1-segmented.

Antennae (fig. 37) : scape yellowish with brownish patch at centre ; pedicel yellow with a small basal part brown ; funicle segments 1–3 and club black ; funicle segments 4–6 yellow (sometimes fourth segment brown) ; scape over 3 times longer than broad, as long as club ; pedicel shorter than funicle segments 1–3 combined ; all funicle segments

wider than long, sixth widest and longest, first least wide, a gradual decrease in length from first to fourth segment, latter the shortest; club slightly compressed with rounded apex, wider than funicle, longer than 5 preceding segments combined, club segments 1–3 with 1, 3, 3 sensoria respectively.

Thorax: yellowish; narrower than head; flat; dorsum faintly reticulate except metanotum and propodeum which are striated and smooth respectively; all margins of dorsum dark brown; sterna and pleura whitish-yellow with blackish occipital processes; pronotum visible with oblique brown band on expanded lateral region, 10 pairs of long setae along posterior margin (fig. 41, *s*); scutum wider than long, longer than scutellum, latter with broadly rounded apex; meso-postphragma short with broadly rounded apex extending to second abdominal tergum.

Fore wings: hyaline; extending to apex of abdomen (sometimes short and rudimentary); speculum interrupted in basal half by 3 transverse rows of setae; costal cell narrow; submarginal vein with 8 long setae; stigmal vein much longer than postmarginal; marginal fringe very short.



FIGS. 37–43.—*Xanthoencyrtus semiapterus* Mercet. (37) Antenna. (38) Male antenna. (39) Subgenital plate. (40) Outer plate of ovipositor (*A*) and second valvifer (*B*). (41) Pronotum. (42) Incomplete fore leg. (43) Middle leg.

Hind wings : apex narrowly rounded ; length of hair of marginal fringe about one-half width of disc ; 3 long curved hooklets at apex of marginal vein.

Fore legs (fig. 42) : coxae and trochanters yellow ; femora, tibiae and tarsal segments 1–4 yellowish-orange ; fifth tarsal segment dark brown ; femora and tibiae expanded ; 3 short, stout pegs near base of tibial spur ; 2 short, stout setae in dorsal angle of distal rim of tibiae.

Middle legs (fig. 43) : coloration as fore legs ; tibial spur slender, a little shorter than basitarsus ; latter slightly longer than second tarsal segment ; 2 short, stout pegs on distal rim of tibiae, and 2 short, stout setae just anterior to the pegs ; basitarsus with a mid-longitudinal row of 5 long setae on ventral surface, and a row of 3 short, stout pegs on either side of the setal row.

Hind legs : coloration as fore legs ; femora greatly dilated ; tibiae moderately dilated ; 3 long setae on anterior face of distal half of coxae ; 9 short, stout setae along distal rim of tibiae.

Abdomen : subtriangular ; elongated ; over 1·5 times longer than thorax ; apex narrow ; brownish-yellow with anterior margin of second tergum dark brown ; dorsum flat with sparing growth of short setae ; subgenital plate extends to apex of abdomen with middle portion of anterior margin convex (fig. 39) and each anterolateral angle with a narrow oblique apodeme (*a*) ; ovipositor short, slender, and concealed by subgenital plate ; proximal two-thirds of dorsal margin of outer plates of ovipositor thickened (fig. 40*A*, *t*) ; first valvifers triangular with acute vertex and straight base ; second valvifers with thickened dorsal margin and apices slightly protruded to form dark brown undifferentiated third valvulae (fig. 40*B*, *p*).

Male.

Resembles female except in the following characters :

Head black with lower clypeal margin, interscrobal area and a little of upper part of occiput yellowish ; antennae blackish ; scape clearly longer than club ; pedicel slightly longer than broad, clearly shorter than each funicle segment ; funicle segments cylindrical, clearly longer than broad, with long setae arranged in whorls, first funicle segment longest, third shortest, second and fifth the same length ; 7 scale-like sensorial organs in a row on sixth segment ; club entire, lanceolate, with long setae arranged in whorls, and 1 sensorium near apex, shorter than combined lengths of preceding 2 segments (fig. 38) ; thorax black ; tegulae brownish with black apex ; wings clearly extend beyond apex of abdomen ; fore and middle coxae yellowish with articular area blackish ; hind coxae black, remaining parts of legs yellowish except fore femora and hind femora which are brown and dark brown respectively ; abdomen black.

Length of female 1·29 mm.

Material.—Twenty-five females and 21 males reared on different dates from *Ripersia hibernica* Newst. on *Holcus mollis* L. at Silwood Park. A few females and males have been deposited in the British Museum (Nat. Hist.).

7. *Trichomasthus* Thomson.

This is an easily recognisable genus of Encyrtidae. A few new generic characters have been found :

Anterior margin of subgenital plate produced conically in the middle (fig. 48, *c*) while knobs (*k*) on sides of central notch of posterior margin are followed by short ridges (*r*) ; outer plates of ovipositor moderately broad with apical half broader (fig. 47*A*) ; first valvifers like an elongated triangle with acute vertex and curved base (fig. 47*B*, *b*).

Trichomasthus frontalis sp. n. seems to be a new species. It runs down well in Mercet's (1921) key to *T. cyaneus* (Dalman), which is represented in the British Museum. It is certainly close to that species.

Revised Key to Species of Trichomasthus *Based on Females.*

1 Pedicel almost as long as first funicle segment; funicle cylindrical; less than 6 longitudinal rows of large punctures extending from vertex to the face 2

– Pedicel much shorter than first funicle segment; funicle compressed; 6 longitudinal rows of large punctures extending from vertex to face; wings smoky, hyaline at base, with 2 triangular hyaline patches before apical third . . . . . **T. procerus** Mercet

2 Funicle black, uniformly coloured 3

– Funicle brown, with fifth segment, sometimes also the sixth, yellowish; wings hyaline . . . . . **T. cyanifrons** (Dalman)

3 Fore wings with 1 or 2 transverse smoky bands; fore coxae and femora black 4

– Fore wings hyaline or lightly smoky towards apex; fore coxae whitish-yellow; femora and tibiae yellow; middle legs yellow with femora lightly obscured towards base . . . . . **T. albimanus** Thomson

4 Four longitudinal rows of large punctures extending from vertex to face; mesopleura brownish-black; fore wings with 1 transverse smoky band on apical third, sometimes another band on the middle leg also; fore femora black, tibiae dark brown with apical half and tarsi yellow; middle femora without the white ring at base, tibiae dark brown with apical half yellowish; hind tibiae dark brown; dorsum of abdomen obscure green . . . . . **T. cyaneus** (Dalman)

– Two longitudinal rows of large punctures extending from vertex to face; mesopleura blue; fore wings lightly smoky with only 1 transverse smoky band on apical third; fore femora black with trochantellus brown and apical third brownish-yellow, tibiae and tarsi brownish-yellow; middle femora almost blackish with a white ring at base, tibiae colourless with a blackish patch on basal third; hind tibiae brownish-yellow with a black patch on basal third; dorsum of abdomen blue . . . . . **T. frontalis** sp. n.

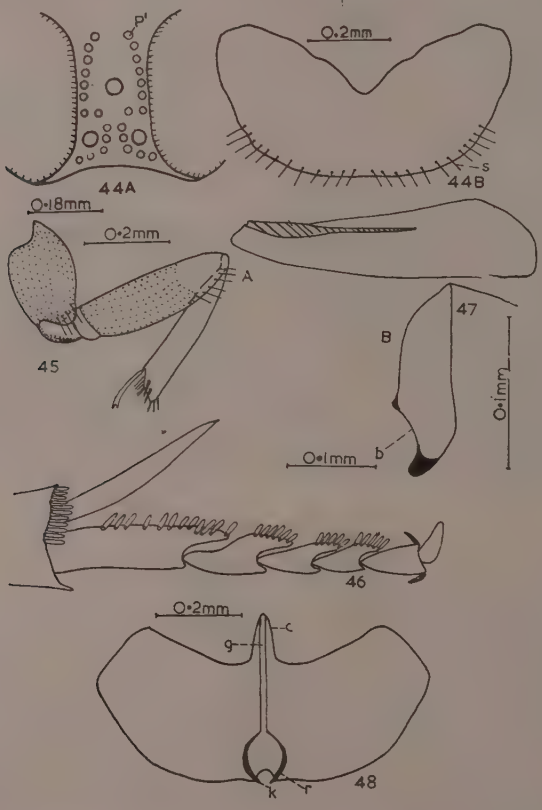
Trichomasthus frontalis sp. n.

Female.

Head: reticulate with scattered short white setae; frontovertex, face and malar space blue with bluish reflections from frontovertex, as well as from bell-shaped scrobes, while malar space and remaining region of face give crimson reflections; occiput black and dull with sharp margin; frontovertex longer than wide with a U-shaped structure of 16 large punctures (fig. 44*A*, *P*) enclosing anterior ocellus and extending from vertex to face; each basal ocellus flanked mesally by an arc formed of 5 large punctures; transverse diameter of eye a little shorter than twice width of frontovertex; malar space almost as long as transverse diameter of eye; diameter of antennal socket a little over half the distance between antennal sockets; diameter of basal ocellus is one and a third times the distance from eye rim and one-half times the distance from occipital margin; mandibles robust, with broad apex, outer tooth narrow, other two broadly rounded, outer and central teeth each with a mandibular gland.

Antennae : inserted away from lower clypeal margin but below level of lower rim of eyes ; scape brownish-yellow, more than 8 times longer than wide, shorter than combined lengths of funicle segments 1–4 ; pedicel black with brownish-yellow apex, over 1·5 times longer than wide, a little shorter than first funicle segment ; funicle black ; segment longer than broad, gradually decreasing in length, with the sixth segment shortest, progressively increasing in width with sixth segment widest, first 3 segments cylindrical, considerably longer than wide ; club black, truncated at apex, clearly shorter than combined lengths of preceding 3 segments ; first funicle to third club segment with 3, 3, 5, 5, 5, 5, 6, 6, 4 sensoria respectively.

Thorax : metallic ; protergum, tegulae and prosternum black ; scutum, axillae, metatergum, propodeum, pleura, meso- and metasterna blue ; scutellum green with bluish apical border ; propleura with crimson reflections ; scutum, metapleura and lateral region of propodeum with greenish reflections ; remaining parts of thorax dull ; pronotum reticulate, anterior margin notched in the middle, posterior margin straight with 12 pairs long setae (fig. 44*B*, *s*) ; scutum entire, flat, reticulate, slightly longer than scutellum ; latter



FIGS. 44–48.—*Trichomasthus frontalis* sp. n. (44) Frontovertex (*A*) and pronotum (*B*). (45) Incomplete fore leg. (46) Incomplete tibio-tarsal portion of middle leg. (47) Outer plate of ovipositor (*A*) and first valvifer (*B*). (48) Subgenital plate.

and axillae reticulate-scaly, metatergum striated, propodeum reticulate; sternopleural sutures of meso- and metathorax distinct; meso-postphragma short, not extending into abdomen.

Fore wings: extending beyond apex of ovipositor; lightly smoky with a broad, distinct transverse smoky band near apical margin; marginal vein as long as post marginal; stigmal vein longer than either.

Hind wings: hyaline; 3 long curved hooklets at apex of marginal vein; apex narrowly rounded.

Fore legs (fig. 45): coxae, under surface of trochanters, femora except trochantellus and apical third, black; remaining part of trochanters, trochantellus brown; apical third of femora, tibiae and tarsi brownish-yellow; 4 long setae on outer face of distal half of coxae; 2 long and thick setae near base of tibial spur and 3 short and stout setae in dorsal angle of distal rim.

Middle legs: coxae and femora except basal and apical ends, black; trochanters, basal and apical ends of femora and basal tip of tibiae brown, but a narrow whitish band near base of femora; tibiae, except basal tip, colourless with a blackish patch on basal third; tarsi yellowish; tibial spur longer than basitarsus; latter slightly shorter than combined lengths of tarsal segments 2–3; a row of 6 long setae on outer face of coxae; 11 short, stout pegs along distal rim of tibiae; ventral surface of basitarsus with 2 convergent rows of 23 short, stout pegs; each tarsal segment 2–3 with 2 rows of 11 pegs, fourth segment with only 5 pegs (fig. 46).

Hind legs: coxae and femora black except trochantellus and apex of femora which are brown; coloration of remaining parts as in fore legs with a black patch on basal third of tibiae; 4 long setae on anterior face of distal half of coxae; 2 weak tibial spurs of unequal lengths; 17 long, stout setae along distal rim of tibiae.

Abdomen: longer and narrower than thorax; bluish with greenish, crimson and yellowish reflections; subgenital plate extending to basal half of ovipositor and possessing a mid-longitudinal groove (fig. 48, *g*); ovipositor thick, exserted to about one-eighth length of abdomen with base lying in second segment.

MALE.

Resembles female except in the following characters:

Entire head green with greenish and crimson reflections; antennae dark brown except inner surface of scape and apex of pedicel which are colourless; scape just over 5 times longer than wide, shorter than combined lengths of funicle segments 1–2, about 1·5 times length of club; pedicel short, less than one-third the length of the first funicle segment; all funicle segments cylindrical, much longer than broad; club lanceolate, shorter than combined lengths of preceding two segments; whorls of long setae on funicle and club; third funicle segment to club with 1, 1, 1, 2, 6 sensoria respectively; fore wings without any smoky band; fore coxae and trochanters yellowish, femora, tibiae and tarsal segments 1–4 brown, fifth segment dark brown; proximal half of middle femora yellowish, distal half brownish; tibiae yellowish with a brown patch on proximal half, tarsal segments 1–4 brown, fifth dark brown, hind trochanters and apical ends of femora dark brown, apical half of tibiae and entire tarsi dark brown, basal half of tibiae blackish with the tip dark brown.

Length of female 2·22 mm.

Material.—Holotype female reared 24.ix.53; 2 female paratypes on different dates. Allotype male bred 24.ix.53; 2 male paratypes on different dates. Endoparasite of *Eriopeltis festucae* (Fonsc.) on *Festuca rubra* L. at Silwood Park. The holotype and allotype have been deposited in the British Museum (Nat. Hist.).

The male of *T. frontalis* sp. n. also differs from that of *T. cyaneus* (Dalman) as follows :

	T. frontalis sp. n. ♂.	*T. cyaneus* (Dalman) ♂.
(1)	Head green.	Head obscure blue, almost black, with face greenish.
(2)	Antennae dark brown with inner surface of scape and apex of pedicel colourless.	Antennae brown with scape almost black.
(3)	Scutellum green with bluish apex.	Scutellum obscure blue, almost black.
(4)	Basal half of middle femora yellowish, apical half brownish ; tibiae yellowish with a brown patch in basal half.	Middle femora in greater part brown ; tibiae in greater part brown.
(5)	Abdomen blue.	Abdomen black.

8. *Thomsonisca* Ghesquière.

Ferrière (1953*b*) declared *Thomsoniella* Mercet (1921) to be a synonym of *Thomsonisca* Ghesquière (1946). He gave no reason for giving priority to *Thomsonisca*, but it appears that he had based his decision on the fact that the name *Thomsoniella* is pre-occupied by a genus of Hemiptera erected by Signoret (1880). A few new characters are suggested below to separate it from *Doliphoceras* Mercet.

	Thomsonisca Ghesquière.	*Doliphoceras* Mercet.
(1)	Pronotum moderately broad with narrow middle region (fig. 49).	Pronotum uniformly broad.
(2)	Subgenital plate uniformly broad with very wide mid-longitudinal groove, and knobs on sides of the notch of the posterior margin followed by laterally directed ridges (fig. 52, *g*, *k*, *r*).	Subgenital plate V-shaped (fig. 57).
(3)	Basal half of ovipositor concealed by subgenital plate.	Entire ovipositor concealed by subgenital plate.
(4)	Apical half of outer plates of ovipositor wide with narrowly rounded apex (fig. 53*A*).	Basal half of outer plates of ovipositor moderately broad ; apical half sharply attenuated (fig. 59*A*).
(5)	First valvifers like an elongated triangle (fig. 53*B*).	First valvifers oblong (fig. 59*B*) ; third valvulae like undemarcated finger-like extensions of second valvifers (fig. 59*C*).

The genus *Thomsonisca* has not been previously recorded from Great Britain. *T. typica* Mercet, which is not represented in the British Museum, was the only species in the genus but the addition of *T. britannica* sp. n. makes the following key now necessary :

Key to Species of Thomsonisca *Based on Females.*

1 A violet tinge on head and thorax ; club as long as 3 preceding segments combined ; scutum and scutellum shagreened ; fore coxae and tibiae yellowish with obscure ring on base of tibiae ; middle coxae and femora yellowish ; hind coxae yellowish **T. typica** (Mercet)

– No violet tinge on head and thorax ; club clearly shorter than 3 preceding segments combined ; scutum and scutellum reticulate-scaly ;

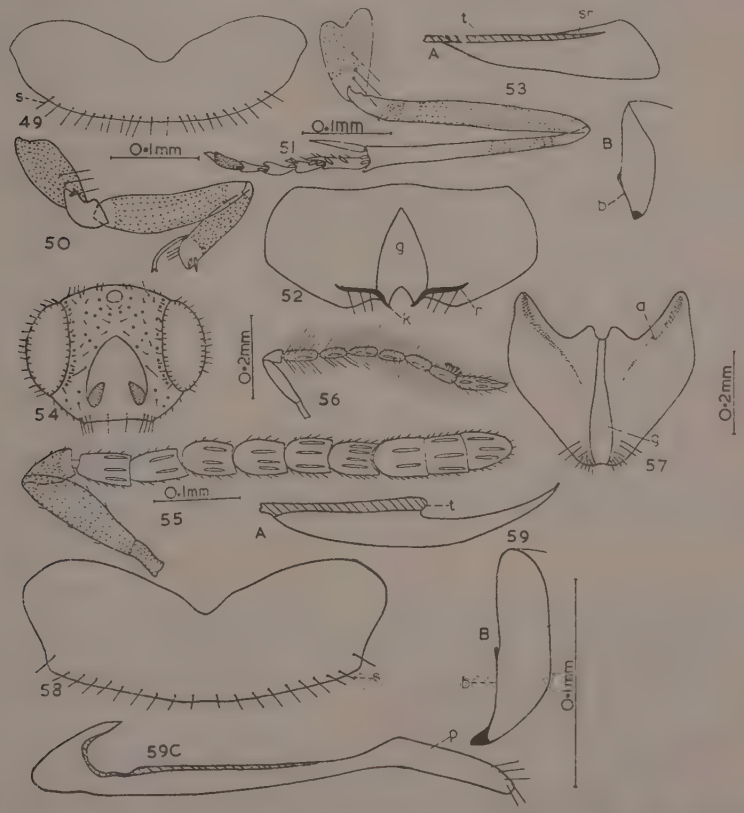
fore coxae black, tibiae dark brown with basal and apical quarters yellowish-brown; middle coxae black with apex yellowish-brown, femora dark brown with a narrow dirty white band near the base, femoral apex yellowish-brown; hind coxae black

T. britannica sp.n.

Thomsonisca britannica sp. n.

FEMALE.

Head: black; suboval; vertex (in lateral view) descends uniformly to meet the face; reticulations well marked on frontovertex; the latter broad, width slightly less than longitudinal diameter of eye; malar space about two-thirds width of frontovertex; basal ocellus removed from occipital margin by one and one-third times its distance from eye rim, mandibles exserted, bidentate with 1 broad truncation; outer tooth long and acute, mesal one short with rounded apex, 2 mandibular glands going to the teeth; apical segment of 3-segmented maxillary palps the longest, labial palps short, 2-segmented.



FIGS. 49–59.—(49–53) *Thomsonisca britannica* sp. n. (49) Pronotum. (50) Incomplete fore leg. (51) Middle leg. (52) Subgenital plate. (53) Outer plate of ovipositor (*A*) and first valvifer (*B*). (54–59) *Doliphoceras pseudococci* sp. n. (54) Facial view of head. (55) Antenna. (56) Male antenna. (57) Subgenital plate. (58) Pronotum. (59) Outer plate of ovipositor (*A*), first valvifer (*B*) and second valvifer (*C*).

Antennae : inserted well away from lower clypeal margin ; scape, pedicel almost blackish, funicle and club brown : scape about 5 times longer than broad, shorter than club ; pedicel shorter than first funicle segment ; funicle segments longer than broad, first funicle segment shortest, 2–4 of equal length, club shorter than combined lengths of preceding 3 segments (0·18 : 0·2 mm.), first funicle to third club segment with 2, 2, 2, 2, 2, 3, 2, 1, 1 sensoria respectively.

Thorax : black ; scutum and scutellum reticulate-scaly ; pronotum, axillae and pleura faintly reticulate ; metanotum and propodeum striated ; posterior pronotal margin with 11 pairs of long setae (fig. 49, *s*) ; scutum convex, longer than scutellum ; scutellum with rounded apex ; meso-postphragma moderately long with narrow apex extending to second abdominal tergum.

Fore wings : hyaline ; speculum interrupted in basal half by 4 transverse rows of setae ; marginal fringe very short.

Hind wings : hyaline ; moderately broad with pointed apex ; 3 curved hooklets at apex of marginal vein.

Fore legs (fig. 50) : coxae black ; trochanters dirty white ; femora dark brown with trochantellus dirty white and apex yellowish-brown ; base and apical quarter of tibiae, tibial spur, tarsal segments 1–4 yellowish-brown, remaining part of tibiae and fifth tarsal segment dark brown ; 3 long setae on anterior face of distal half of coxae ; 2 short, stout pegs near dorsal angle of distal rim of tibiae.

Middle legs (fig. 51) : coxae black with apical area yellowish-brown ; trochanters dirty white ; femora and fifth tarsal segment dark brown with a narrow dirty white band near base, and apex yellowish-brown ; tibiae, tibial spur and tarsal segments 1–4 yellowish-brown with a dark brown patch on basal half of tibiae ; tibial spur equals basitarsus in length ; basitarsus almost as long as second and third segments combined ; 3 long setae on anterior face of distal half of coxae ; 2 short, stout pegs on distal rim of tibiae ; 5 long setae along mid-longitudinal line of basitarsal ventral face with a row of 4 short, stout pegs on either side ; 2 pegs on apex of second tarsal segment, 1 peg on each third and fourth segments.

Hind legs : coxae black ; trochanters and femora dark brown with femoral apex yellowish-brown ; tibiae and fifth tarsal segment dark brown with tibial ends yellowish-brown ; tarsal segments 1–4 yellowish-brown ; 3 long setae on anterior face of distal half of coxae ; 9 short, stout setae on distal rim of tibiae.

Abdomen : black ; dorsum striated ; ovipositor thick, exserted to about one-fifth length of abdomen, base lying in third segment ; outer plates of ovipositor with basal two-thirds of dorsal margin thickened, the thickening extending on distal third as submarginal ridge (fig. 53A, *t*, *sr*) ; third valvulae immovably joined with second valvifers.

MALE.

Resembles female except in the following characters :

Scape as long as club ; funicle and club brownish-yellow with very long setae arranged in whorls ; funicle segments progressively increasing in length with sixth segment longest ; club entire, conical, clearly shorter than preceding 2 segments together ; coloration of body on the whole lighter.

Length of female 1·28 mm.

Material.—Holotype female reared 9.vi.53, and 30 female paratypes on different dates. Allotype male and 20 male paratypes on different dates. Endoparasite of *Chionaspis salicis* L. on *Tilia* sp. at Silwood Park. The holotype, allotype and a few paratypes have been deposited in the British Museum (Nat. Hist.).

9. *Doliphoceras* Mercet.

A few new characters have been discovered which make the genus *Doliphoceras* Mercet all the more distinct from *Thomsonisca* Ghesquière (see page 450). This genus has not previously been recorded from Great Britain.

Doliphoceras pseudococci sp. n.

FEMALE.

Head (fig. 54): black; reticulate; vertex, upper region of face, malar space with scattered setigerous and non-setigerous small punctures, a row of such punctures along inner margin of each eye; scrobes bell-shaped, interscrobal area depressed; frontovertex very wide, width a little greater than longitudinal diameter of eye; eyes pubescent, over 2·3 times longer than malar space; ocelli reddish, basal ocellus separated from eye rim by 2·75 times its distance from occipital margin; lateral tooth of mandibles shorter than inner one, 2 mandibular glands opening on the teeth; maxillary and labial palps 3- and 2-segmented respectively with apical segment largest.

Antennae (fig. 55): scape, pedicel very dark brown with pedicellar apex brownish-yellow; funicle and club dark brown; scape 3·5 times longer than broad, clearly longer than pedicel and first funicle segment together, pedicel as long as first funicle segment; all funicle segments cylindrical, clearly longer than broad, first segment longest, third and fourth shortest and almost equal, club almost as long as the 3 preceding segments combined, apex broadly rounded; first funicle segment to third club segments with 3, 2, 3, 3, 3, 4, 2, 3, 3 sensoria respectively.

Thorax: black; reticulate except metanotum which is striated; 10 pairs of long setae along straight posterior margin of pronotum (fig. 58, *s*); scutum, axillae and scutellum with scattered small non-setigerous punctures; apex of scutellum narrowly rounded; meso-postphragma with narrow apex extending to second abdominal tergum.

Fore wings: hyaline; extending beyond apex of abdomen; 14 short setae on submarginal vein; postmarginal vein very short; speculum interrupted in basal half by 2 transverse rows of setae; marginal fringe very short.

Hind wings: hyaline; moderately broad with narrowly rounded apex; 3 curved hooklets at apex of marginal vein.

Fore legs: coxae, trochanters, tibiae and tibial spur yellow with proximal end of coxae blackish; femora dark brown; tarsi brownish-yellow; 2 long setae on anterior face of distal half of coxae; 1 short, stout peg just above base of tibial spur; 2 short, stout setae in dorsal angle of distal rim of tibiae.

Middle legs: coxae dark brown; trochanters, tibiae, tibial spur and tarsi yellow; femora yellowish-brown; 2 long setae on anterior face of distal half of coxae; 5 long, stout pegs on distal rim of tibiae; ventral surface of basitarsus with a mid-longitudinal row of 6 long, stout pegs and another row of 8 long, thick setae; tarsal segments 2–4 with 3 long, stout pegs and 1 long, thick seta on each; tibial spur slightly longer than basitarsus, latter clearly longer than combined lengths of tarsal segments 2–3.

Hind legs: coxae and femora dark brown with femoral apex yellowish; trochanters yellow; tibiae, tibial spur and basitarsus brownish-yellow; tarsal segments 2–5 dark brown; 2 long setae on anterior face of distal half of coxae; 10 short, stout setae on distal rim of tibiae and 8 thick, stout setae along dorsal margin of distal third of tibiae.

Abdomen: dark brown; reticulate: anterior and posterior margins of subgenital plate with a central notch on each, the 2 notches connected by a moderately wide mid-longitudinal groove (fig. 57, *g*); anterolateral apodemes (*a*) extending to middle of subgenital plate; ovipositor thick with base lying in the third segment; basal half of outer plates of ovipositor with thickened dorsal margin (fig. 59*A*, *t*), apex of distal half reflected upwards.

Male.

Resembles female except in the following characters :

Antennae (fig. 36) with very long dark brown setae in whorls on flagellum ; segments of funicle much longer than broad ; first funicle segment slightly less than twice length of pedicel, sixth with 5 scale-like sensoria organs ; club lanceolate ; fore coxae brown, bases and apices of femora yellowish ; middle femora yellowish at base and apex ; base of hind femora also yellowish, tibiae brown with apical quarter yellowish ; abdomen suboval ; size smaller.

Length of female 1·68 mm ; scape (pedicel and first funicle segment together) 0·24 (0·15) ; basal ocelar triangle 0·116 mm. ; *distance between antennal sockets* 0·086 mm.

Material.—Holotype female reared 28.vi.53 ; 7 female paratypes, 1 male allotype and 3 male paratypes bred on different dates. Endoparasite of *Pseudococcus comstocki* Green on *Pyrus sylvestris* L. at Silwood Park. The holotype and allotype have been deposited in the British Museum (Nat. Hist.).

Diaphorencyrtus pseudococci sp. n. resembles *D. integralis* Mercet, which is not represented in the British Museum, but the differences are sufficient to make it a new species.

D. pseudococci sp. n.	*D. integralis* Mercet.
(1) Head reticulate.	Head almost smooth.
(2) Ocelli reddish ; distance between basal ocelli one and one-third times distance between antennal sockets.	Ocelli hyaline ; distance between basal ocelli approximately the same as that between antennal sockets.
(3) Scape clearly longer than pedicel and first funicle segment combined.	Scape as long as pedicel and first funicle segment combined.
(4) Apex of pedicel brownish-yellow.	Entire pedicel black.
(5) Mesotergum distinctly reticulate.	Mesotergum smooth.
(6) Fore coxae, trochanters and tibiae yellow with proximal region of coxae blackish.	Fore legs black with tibiae brownish yellow.
(7) Middle trochanters and tibiae yellow.	Middle legs as fore legs.
(8) Hind trochanters yellow.	Hind trochanters black.
(9) *Pseudococcus comstocki* Green as host.	Host not recorded by Mercet.

10. *Aphycoides* Mercet.

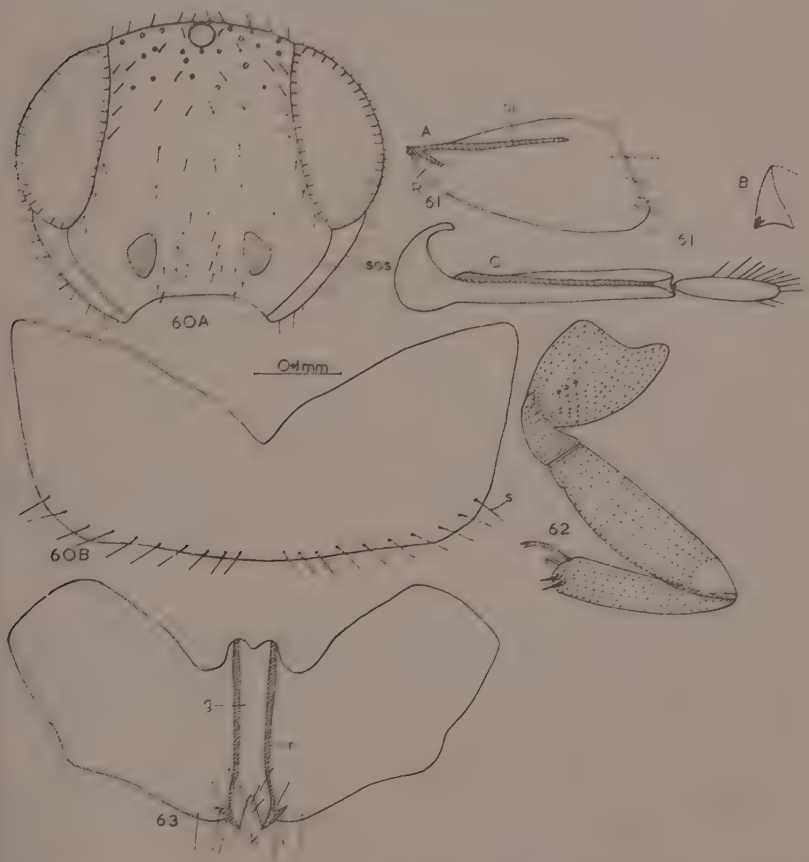
Mercet (1923) separated *Aphycoides* from *Apigonus* Mayr. Ferrière (1955*b*) accepted the genus and gave key characters for the female. The present writer has discovered the following new characters for the genus :

Mid-longitudinal groove of subgenital plate flanked on sides by ridges which extend to respective knobs of central notch of posterior margin (fig. 63, *g. r. b*) ; basal half of ovipositor concealed by subgenital plate ; outer plates of ovipositor very broad in apical half and with a truncus submarginal ridge along dorsal margin (fig. 61*A*, *sr. b*) ; third valvulae in ball-and-socket-like articulation with second valvifers (fig. 61*C*).

Mercet (1927) recorded *Aphycoides mantisensis* from a single male specimen from Spain. Later (1928), he described a Swedish species, studying both male and female, under the name "*Aphycoides sp.*!", but was rather doubtful

about its separation from *Aphycoides matritensis*. Ferrière (1953*a*) described both male and female of a British species under the name "*Aphycoides merceti*" and treated it as identical with the Swedish species. There are thus now two species in the genus, viz. *A. matritensis* Mercet and *A. merceti* Ferrière. Ferrière also gave distinguishing characters of the male *A. merceti* to separate it from the male of *A. matritensis*.

The material of the British species was sent to Ferrière by Professor O. W. Richards, of the Imperial College, London, who collected it from Silwood Park. The present writer also collected the same species from the same host and locality. A fairly detailed account of both the sexes is given by Mercet (1923). The following may be added to it.



FIGS. 60–63.—*Aphycoides merceti* Ferrière. (60) Facial view of head (*A*) and pronotum (*B*). (61) Outer plate of ovipositor (*A*), first valvifer (*B*) and second valvifer (*C*). (62) Incomplete fore leg. (63) Subgenital plate.

Aphycoides merceti Ferrière.

Female.

Head (fig. 60*A*): vertex, upper part of face reticulate-scaly with small punctures; rest faintly reticulate; occipital margin sharp; frontovertex very wide, twice as wide as eye; malar space moderately long (0·15 mm.) and about 1·5 times width of eye; subocular sutures (*sos*) distinct; a mandibular gland to each outer and central teeth; maxillary palps 4-segmented with apical segment longest; labial palps 3-segmented with basal segment longest.

Antennae: inserted well away from lower clypeal margin; scape about 5 times longer than wide, longer than club; pedicel clearly wider than any of first 3 funicle segments, longer than combined lengths of first 2 segments, latter equal in length and individually longer than wide, third segment the shortest, sixth the longest; club longer than combined lengths of funicle segments 3–6; fifth funicle segment to third club segment with 1, 2, 3, 3, 2 sensoria respectively.

Thorax: pronotum moderately broad in the middle, anterior margin notched at centre, posterior margin straight with 10 pairs of long setae (fig. 60*B*, *s*); scutum, scutellum, pleura and sterna reticulate; axillae faintly reticulate; metanotum striated, propodeum smooth; meso-postphragma short with apex broadly rounded extending to second abdominal tergum.

Fore wings: costal cell broad; marginal vein about twice as long as broad; hind wings with 3 long, curved hooklets at apex of marginal vein.

Fore legs (fig. 62): 3 long setae on anterior face of distal half of coxae; 2 long, stout setae near dorsal angle of distal rim of tibiae.

Middle legs (fig. 64): basitarsus about one and a third times longer than tibial spur, latter as long as second tarsal segment; 3 long setae on anterior face of distal half of coxae; no pegs on distal rim of tibiae; 3 longitudinal rows of 16 short, stout pegs and a row of 5 long, thick setae on ventral face of basitarsus, second tarsal segment with 6 short, stout pegs and 1 long, thick seta, third and fourth segments with 5 pegs and 1 seta each.

Hind legs: 3 long setae on anterior face of distal half of coxae; 1 short, thick seta near base of spur and another seta near dorsal angle of tibial distal rim; 13 short setae along distal rim of tibiae.

Abdomen: subgenital plate uniformly broad, centrally placed notches on anterior and posterior margins connected by a mid-longitudinal groove (fig. 63, *g*); ovipositor scarcely exserted with base lying in fifth segment; outer plates of ovipositor with broadly rounded apex; first valvifers triangular with dorsoposterior angle modified into a strong articular knob (fig. 61*B*).

Length of female 1·86 mm.

Material.—Thirteen females and one male reared on different dates. Endoparasite of *Physokermes abietis* (Geoffroy) on *Picea excelsa* Link. at Silwood Park. A few females have been deposited in the British Museum (Nat. Hist.).

11. *Psyllaephagus* Ashmead.

A few new generic characters have been discovered for the genus *Psyllaephagus* Ashmead, as follows:

Pronotum uniformly broad with distinctly curved posterior margin (fig. 67); middle of anterior margin of subgenital plate cone-like (fig. 68, *c*) and connected with the central notch of posterior margin by a narrow longitudinal groove (*g*); basal third of ovipositor concealed by subgenital plate; outer plates of ovipositor uniformly broad with marginal

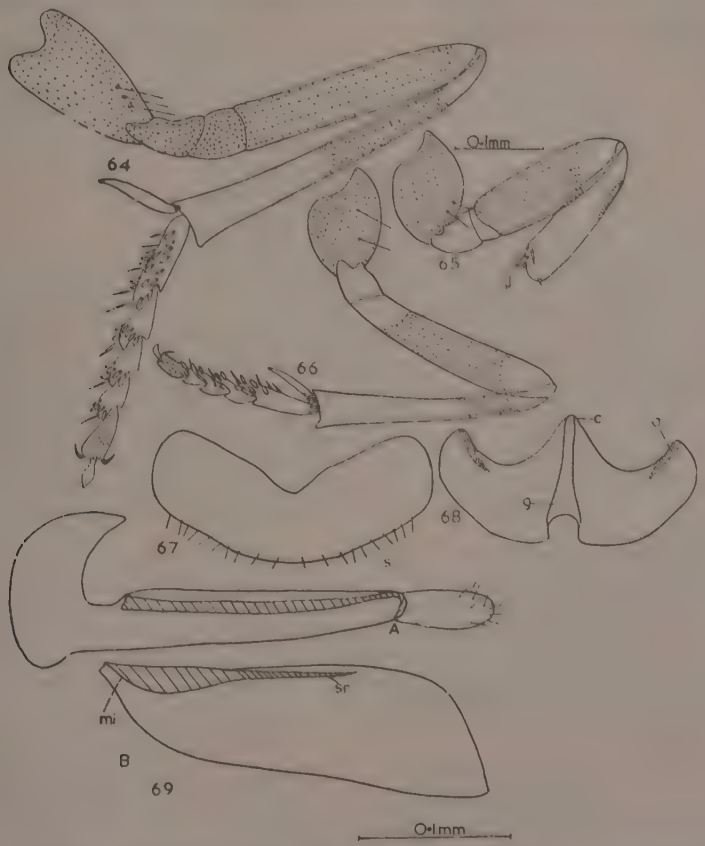
inflection (fig. 69*B*, *mi*) along basal third of dorsal margin ; first valvifers like an elongated triangle with acute apex ; third valvulae with broadly rounded apex.

This genus has not previously been recorded from Great Britain, and it is also bred for the first time from a coccid.

Psyllaephagus cocci sp. n.

FEMALE.

Head : face, malar space, frontovertex, and occiput green ; metallic with faint bluish and greenish reflections ; faintly reticulate ; a row of setae along inner rim of each eye ; top of head convex (side view) ; face depressed ; scrobes more or less bell-shaped ; occipital margin acute ; frontovertex wide, width equals transverse diameter of eye ; eyes brownish, naked with transverse diameter 1·25 times length of malar space ; base of ocellar triangle 4 times diameter of basal ocellus, latter removed from eye rim by 1·25 times its diameter ; outer tooth of mandible short, narrowly rounded, central tooth incomplete and followed



FIGS. 64-69.- (64) *Aphycoides merceti* Ferrière. Middle leg. (65-69) *Psyllaephagus cocci* sp. n. (65) Incomplete fore leg. (66) Middle leg. (67) Pronotum. (68) Subgenital plate. (69) Second valvifer (*A*) and outer plate of ovipositor (*B*).

by a truncation, each tooth with a mandibular gland ; maxillary palps 4-segmented, apical segment longest ; labial palps 3-segmented, basal segment longest.

Antennae : scape and pedicel very dark brown, rest dark brown ; scape 5·5 times longer than wide, longer than either funicle or club ; pedicel longer than funicle segments 1–2 combined ; funicle segments 1–3 individually as long as wide, segments 4–6 wider than long ; first segment shortest and least wide ; club ovate, longer than combined lengths of preceding 4 segments ; third funicle to third club segment with 1, 1, 1, 2, 2, 4, 1 sensoria respectively.

Thorax : dorsum convex ; pronotum green, finely reticulate with faint bluish and greenish reflections, anterior margin distinctly concave, 10 pairs of long setae along posterior margin (fig. 67, *s*) ; tegulae dark brown ; scutum brassy green, slightly longer than scutellum, finely reticulate with bluish and greenish reflections ; axillae deep green, dull and finely reticulate ; scutellum deep green, reticulate-scaly, dull with narrowly rounded apex ; metanotum faintly striated and dull ; propodeum smooth and dull ; pleura and sterna green, meso-postphragma with narrow apex extending to second abdominal tergum.

Fore wings : hyaline ; extending beyond apex of abdomen ; speculum complete ; costal cell broad ; 9 long dark brown setae on submarginal vein ; postmarginal vein very short, stigmal vein moderately long.

Hind wings : hyaline ; narrowly rounded apex ; 3 long, curved hooklets at apex of marginal vein.

Fore legs (fig. 65) : coxae black ; trochanters, tibiae, tibial spur, tarsal segments 1–4 brownish-yellow with a dark brown patch on outer surface of basal half of tibiae ; femora and fifth tarsal segment dark brown with trochantellus and apical third of femora brownish-yellow ; femora and tibiae expanded ; 2 long setae on anterior face of distal half of coxae ; 1 long, stout seta near base of tibial spur and a stout peg a little distal to the latter ; 1 short, thick seta in dorsal angle of distal rim of tibiae.

Middle legs (fig. 66) : coxae black ; trochanters, tibiae, tibial spur and tarsal segments 1–4 brownish-yellow with a broad dark brown band on basal third of tibiae ; femora and fifth tarsal segment dark brown with base and apical quarter of femora brownish-yellow ; 2 long setae on anterior face of coxae ; 5 short, stout pegs on distal rim of tibiae ; 3 longitudinal rows of 7 short, stout pegs and 1 row of 4 long, thick setae on ventral surface of basitarsus ; 3 short, stout pegs and 1 long, thick seta at the apex of second tarsal segment ; third and fourth tarsal segments each with 1 peg and 1 seta ; tibial spur shorter than basitarsus ; latter slightly shorter than combined lengths of second and third tarsal segments.

Hind legs : coxae black ; trochanters, femora very dark brown with femoral apex brownish-yellow ; tibiae, fifth tarsal segment very dark brown with base and apical third of tibiae brownish-yellow ; tibial spur, tarsal segments 1–4 brownish-yellow ; femora expanded ; 1 long seta on anterior face of distal half of coxae ; 10 short, stout setae on distal margin of tibiae.

Abdomen : green with faint bluish, greenish and yellowish reflections ; finely reticulate ; apex broadly rounded ; subgenital plate narrow, without knobs on sides of central notch of posterior margin, anterolateral apodemes short and oblique (fig. 68, *a*) ; ovipositor blackish, hardly exserted, base lying in third segment ; marginal inflection along basal third of dorsal margin of outer plates extends on to middle third as a narrow submarginal ridge (fig. 69*B*, *sr*) ; second valvifers moderately broad with submarginal ridge along dorsal margin ; third valvulae short, immovably joined with second valvifers.

Length of female 1·32 mm.

Material. –Holotype female reared 14.vii.53. Three female paratypes bred on different dates. Endoparasite of *Asterolecanium variolosum* (Ratzb.) on *Quercus robur* L. at Silwood Park. The holotype has been deposited in the British Museum (Nat. Hist.). *P. cocci* sp. n. resembles *P. cellulatus* Waterston, which is represented in the British Museum, but the following differences make it a distinct new species.

	P. cocci sp. n.	*P. cellulatus* Waterston.
(1)	Eyes brownish.	Eyes black.
(2)	Axillae deep green and dull.	Axillae shining green.
(3)	Fore coxae black ; trochanters, tibiae, tarsal segments 1–4 brownish-yellow with dark brown patch on outer face of basal half of tibiae ; femora dark brown with trochantellus and apical third brownish-yellow.	Coxae green, remaining parts of fore legs yellowish-white.
(4)	Middle coxae black ; trochanters, tibiae, tarsal segments 1–4 brownish-yellow with broad dark brown patch on basal third of tibiae ; femora dark brown with base and apical quarter brownish-yellow.	Coxae green, rest of leg yellowish-white.
(5)	Hind coxae black ; trochanters, femora very dark brown with femoral apex brownish-yellow ; tibiae very dark brown with base and apical third brownish-yellow ; tarsal segments 1–4 brownish-yellow.	Hind coxae green ; trochanters, femora dark brown with femoral apex yellowish-white ; tibiae yellowish-white with a small dark brown patch near base ; tarsal segments 1–4 as in fore legs.
(6)	Parasite of coccid, *Asterolecanium variolosum* (Ratzb.).	Parasite of psyllid, *Rhinocola populi* Laing.

12. *Pseudorhopus* Timberlake.

This genus has a 5-segmented funicle and is the *Rhopus* of Mayr (1875) and of Mercet (1921). Mayr associated his female specimens of *Encyrtus testaceus* Ratzb. with a male received from Walker as *Encyrtus piso* Walker, the type species of Förster's genus. Timberlake (1926), however, on the basis of a North American species having a 5-segmented funicle in both sexes, considered that Mayr's association was wrong, and that *E. piso* and *E. testaceus* were not congeneric. For the genus having a 5-segmented funicle he proposed the name *Pseudorhopus*. Ferrière (1953*b*) accepted this but was unable to include the true *Rhopus* Förster in his key.

This genus is new to Great Britain. The present writer has found a few new generic characters, as follows :

Pronotum moderately broad with anterior margin considerably concave in the middle (fig. 70) ; subgenital plate quadrilateral (fig. 76) and concealing almost the entire ovipositor ; outer plates of ovipositor short, greatly widened in middle with pointed apex (fig. 75*A*) ; second valvifers short and uniformly narrow ; third valvulae like ill-defined stumpy extensions of second valvifers (fig. 75*C*, *p*).

Pseudorhopus britannicus sp. n. is clearly distinct from *P. testaceus* (Ratzb.) and *P. hartmani* Timberlake. The following key is proposed for their identification.

Key to P. britannicus *sp. n. and Closely Allied Species, Based on Females.*

1 Malar space as long as or longer than longitudinal diameter of eye ; scutum without traces of parapsidal sutures ; middle tibial spur as

long as basitarsus 2

– Malar space clearly shorter than longitudinal diameter of eye ; base of ocellar triangle more than double the distance between posterior ocellus and respective eye rim ; first and second funicle segments of equal length ; club with broadly rounded apex ; scutum with traces of parapsidal sutures ; middle tibial spur clearly longer than basitarsus ; basitarsus of middle legs equals second tarsal segment in length . . . . . **P. britannicus** sp. n.

2 Malar space equals longitudinal diameter of eye : ocelli in obtuse angled triangle with base about double the distance between posterior ocellus and respective eye rim ; funicle segments 1–3 of same length ; club truncated at apex ; basitarsus of middle legs equals combined lengths of second and third tarsal segments **P. hartmani** Timberlake

– Malar space longer than longitudinal diameter of eye ; ocelli in equilateral triangle with base almost as long as distance between posterior ocellus and respective eye rim ; funicle segments 1–3 moniliform ; club not truncated at apex ; basitarsus of middle legs shorter than combined lengths of second and third tarsal segments **P. testaceus** (Ratzeburg)

Pseudorhopus britannicus sp. n.

Female.

Head : prognathous type ; suboval ; frontovertex yellowish ; occiput, hypostomal area, malar space, face brown ; face markedly excavated with raised interscrobal area ; frontovertex, occiput faintly reticulate ; remaining parts of head shagreened ; frontovertex 4 times wider than long, width 1·75 times longitudinal diameter of eye (0·1 mm.) ; eyes blackish, naked, posterior part of ocular rim reddish ; subocular suture distinct but incomplete ; malar space (0·083 mm.) shorter than longitudinal diameter of eye ; ocelli orange, basal ocelli very close to occipital margin but well removed from eye rims ; mandibles (fig. 74) with pointed and curved apex with a gland in it, 1 long, thick seta in middle of mesal margin and another similar seta in apical half, mandibular condyle raised, conical, and stout ; maxillary palps short, 2-segmented, labial palps very short, 1-segmented.

Antennae (fig. 73) : inserted on lower clypeal margin ; uniformly brown ; scape cylindrical, a little over 8 times longer than wide, longer than either funicle or club ; pedicel longer than first three and a half funicle segments united, 4 times longer than first funicle segment (0·08 : 0·02 mm.) ; first 2 segments subequal, segments 1–3 short, slightly wider than long, 4–5 long, longer than wide ; segments 1–2 of same length ; club well differentiated from funicle, apex broadly rounded.

Thorax : dark brown ; finely reticulate except metanotum and propodeum which are smooth ; 6 pairs of long setae along posterior margin of pronotum (fig. 70, *s*) ; scutum flat with traces of parapsidal sutures, wider than long, longer and wider than scutellum ; latter with broadly rounded apex ; meso-postphragma dark brown, its narrowly rounded apex extending to third abdominal tergum.

Fore wings : extending beyond apex of abdomen ; a brown patch on marginal, postmarginal and stigmal veins ; speculum interrupted in basal third by 2 transverse rows of setae ; costal cell moderately broad ; submarginal vein not extending beyond basal third of wing ; marginal fringe short.

Hind wings : narrowly rounded apex ; 3 long curved hooklets at apex of marginal vein ; length of hair of marginal fringe slightly over one-third width of wing.

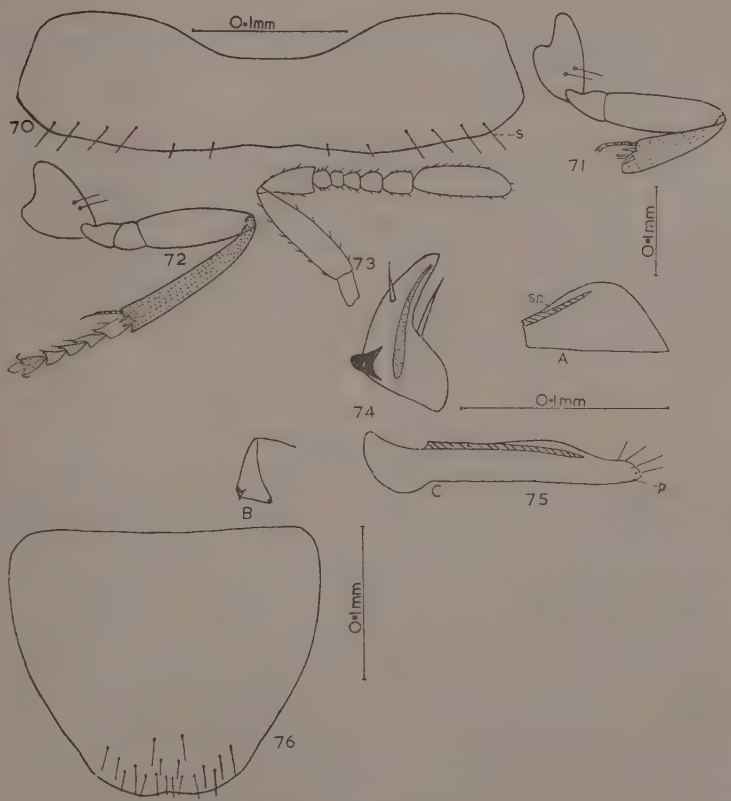
Fore legs (fig. 71) : coxae, trochanters, femora and tarsal segments 1–4 yellowish ; tibiae, tibial spur brown ; fifth tarsal segment dark brown and shorter than basitarsus ;

2 long setae on anterior face of distal half of coxae; 2 short, stout setae near base of spur.

Middle legs (fig. 72): coloration as in fore legs; tibial spur longer than basitarsus (0·049 : 0·04 mm.), latter as long as second tarsal segment but longer than fifth; tarsus broader than hind tarsus; 2 long setae on anterior face of distal half of coxae; no pegs but 2 short, stout setae on distal rim of tibiae; tarsal segments without pegs.

Hind legs: coloration as in fore legs except that femora are brown; basitarsus equals fifth segment in length; 2 long setae on anterior face of distal half of coxae; 7 short, stout setae on distal rim of tibiae.

Abdomen: dark brown, faintly reticulate; apex rounded; posterior margin of subgenital plate greatly reduced, devoid of central notch but with a cluster of long setae: ovipositor hardly exserted, short, lying in apical quarter of abdomen; dorsal margin of outer plates of ovipositor with a submarginal ridge along basal half (fig. 75*A*, *sr*); first valvifers (fig. 75*B*) triangular with dorsoposterior articular knob raised and strong; dorsal



Figs. 70–76.—*Pseudorhopus britannicus* sp. n. (70) Pronotum. (71) Incomplete fore leg. (72) Middle leg. (73) Antenna. (74) Mandible. (75) Outer plate of ovipositor (*A*), first valvifer (*B*) and second valvifer (*C*). (76) Subgenital plate.

margin of basal half of second valvifers thickened, and extending as submarginal ridge on the apical half.

Length of female 1·13 mm.; *base of ocellar triangle* 0·093 mm.; *distance from basal ocellus to eye rim* 0·04 mm.

Material.—Holotype female reared 21.vii.53; 15 female paratypes bred on different dates. Endoparasite of *Physokermes abietis* (Geoffroy) on *Picea excelsa* Link. at Silwood Park. The holotype and a few paratypes have been deposited in the British Museum (Nat. Hist.).

13. *Protyndarichus* Mercet.

Ferrière (1953*b*) synonymised *Tyndarichoides* Mercet with *Protyndarichus* Mercet and kept the latter name. The present writer has discovered a few new generic characters, as follows:

Subgenital plate very narrow in the middle with knob on each side of notch followed by a long, curved ridge (fig. 77, *r*); basal third of ovipositor concealed by subgenital plate; outer plates of ovipositor with marginal inflection along dorsal margin (fig. 80*A*, *mi*); second valvifers very narrow (fig. 80*B*).

In Walker's collections in the British Museum is a male Encyrtid collected from France and identified as *Encyrtus anebus* Walker. Mr. G. J. Kerrich re-identified this specimen and placed it in the genus *Protyndarichus* Mercet. The description of this species in Walker's Monograph No. 4 does not (according to Mr. Kerrich) apply to the specimen. Hence the latter cannot be taken to be *Encyrtus anebus* Walker—a species recorded from the South of England. It is, therefore, the French specimen, and not the species *E. anebus* Walker, which belongs to the genus *Protyndarichus* Mercet. Accordingly, this genus can be taken as new to Great Britain.

Protyndarichus britannicus sp. n.

Female.

Head: colour coppery; bluish and greenish reflections on frontovertex; bluish and yellowish reflections on face and malar space; frontovertex very narrow (0·116 mm.), over 1·5 times longer than wide; width greater than combined lengths of pedicel and first funicle segment; eyes over 1·5 times wider than frontovertex; malar space short, equalling one-fourth transverse diameter of eye; ocelli orange, each basal ocellus removed by twice its diameter from eye rim, and by just over 4 times the diameter from occipital margin; scrobes almost semicircular, interscrobal area raised, distance between antennal sockets a little over half width of frontovertex; outer tooth of mandibles longest and pointed, other two short with rounded apex; outer and central teeth each with a gland.

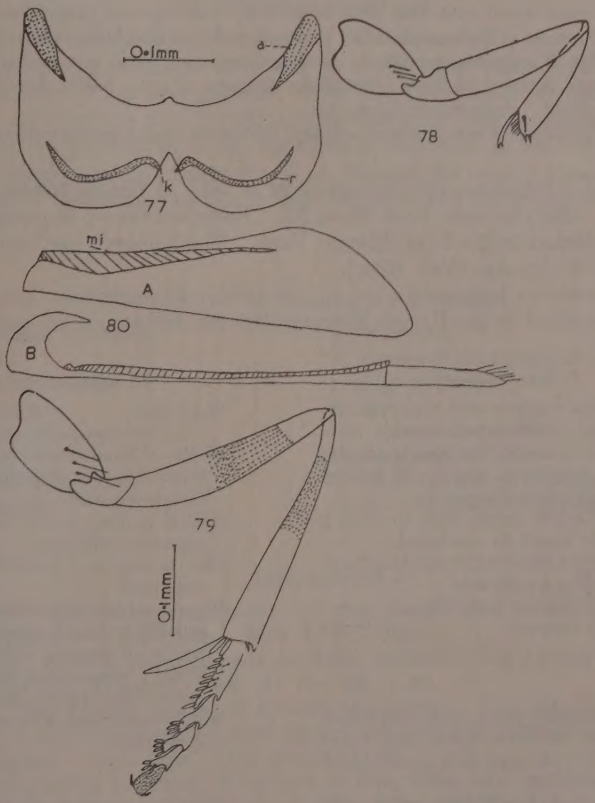
Antennae: inserted near middle of face; shorter than length of body; yellowish; scape 5·5 times as long as wide, longer than funicle and club separately; pedicel longer than funicle segments 1–3 combined; first segment the shortest and least wide, sixth the longest and widest; club longer than combined lengths of preceding 5 segments (0·154: 0·149 mm.), apex broadly rounded with 2 short thick setae, sixth funicle segment to third club segment with 2, 3, 3, 2 sensoria respectively.

Thorax: pronotum, scutum, tegulae and scutellum dark coppery with bluish and greenish reflections; axillae dark coppery and dull; metatergum, propodeum dark coppery, dull.

non-reticulate ; pleura and sterna light coppery with yellowish-white reflections ; scutum flat, wider than long, longer and wider than scutellum, reticulate-scaly with a few small hyaline spots ; scutellum reticulate-scaly ; wings rudimentary, hyaline, extending to third abdominal tergum.

Fore legs (fig. 78) : coxae to tibial spur yellowish ; tarsal segments 1–4 yellowish-orange ; fifth tarsal segment dark brown ; 3 long setae on anterior face of distal half of coxae ; 1 long, stout seta near base of spur ; 2 short, stout setae in dorsal angle of tibial distal rim.

Middle legs (fig. 79) : coloration as in fore legs except for large brown patch on apical half of femora leaving the apex yellow ; a similar patch on basal half of tibiae ; tibial spur shorter than basitarsus ; 3 long setae on anterior face of distal half of coxae ; 2 moderately long, stout pegs on distal rim of tibiae close to spur, and 1 short, stout seta near dorsal angle of distal tibial rim ; 2 longitudinal rows of 13 short, stout pegs and 1 row of 5 short, stout setae on ventral face of basitarsus ; second and third tarsal segments each with 4 pegs ; fourth segment with only 3 pegs.



FIGS. 77–80.—*Protyndarichus britannicus* sp. n. (77) Subgenital plate. (78) Incomplete fore leg. (79) Middle leg. (80) Outer plate of ovipositor (*A*) and second valvifer (*B*).

Hind legs : coloration as on fore legs except a large brown patch on middle region of femora ; 3 long setae on anterior face of coxae ; 11 short, stout setae along distal rim of tibiae.

Abdomen : longer and wider than thorax ; dark coppery with crimson and bluish reflections ; greenish reflections on dorsum of second segment ; anterior margin of subgenital plate highly concave, posterior margin deeply notched in the middle with knobs on sides of notch (fig. 77, *k*), anterolateral apodemes short, broad and oblique (*a*) ; ovipositor thick with base lying in third segment, exserted to about one-sixth length of abdomen ; outer plates of ovipositor long with basal half narrow, apical half broadened and apex narrowly rounded (fig. 80*A*) ; first valvifers triangular with curved base, basal angles modified into feeble articular knobs ; third valvulae conical, immovably joined with second valvifers (fig. 80*B*).

MALE.

Resembles female except in the following characters :

Antennae inserted above middle of face ; scape short, shorter than first 2 funicle segments combined ; pedicel shorter than first funicle segment ; all funicle segments cylindrical, much longer than broad with long setae in whorls ; first segment longest, sixth shortest, segments 2–5 almost of the same length ; club entire, lanceolate, longer than scape, shorter than preceding 2 segments combined ; frontovertex very wide, one and a third times wider than long, width 1·25 times longitudinal diameter of eye ; middle femora and tibiae completely yellow ; abdomen subtriangular.

Length of female 1·33 mm.; pedicel and first funicle segment together 0·09 mm.

Material.—Holotype female reared 24.ix.53 ; 2 female paratypes reared 25.ix.53. Allotype male bred 26.ix.53. Endoparasite of *Ripersia hibernica* Newst. on *Holcus mollis* L. at Silwood Park. The holotype has been deposited in the British Museum (Nat. Hist.).

Protyndarichus britannicus sp. n., resembles *P. metallicus* Mercet, which is not represented in the British Museum, but the differences are quite marked.

	P. britannicus sp. n.	*P. metallicus* Mercet.
(1)	Head dark coppery with bluish, greenish and yellowish reflections.	Head blue.
(2)	Width of frontovertex clearly greater than combined lengths of pedicel and first funicle segment.	Width of frontovertex same as combined lengths of pedicel and first funicle segment.
(3)	Pedicel clearly longer than the first 3 funicle segments combined.	Pedicel as long as the first 2 funicle segments combined.
(4)	Club longer than combined lengths of preceding 5 segments.	Club as long as 3 preceding segments combined.
(5)	Thoracic dorsum dark coppery, mesopleura coppery.	Pronotum blackish-violet ; scutum, scutellum bluish-green, posterior border of scutum, axillae blackish-violet ; propodeum black ; mesopleura blue, greatly obscured.
(6)	Middle femora yellow with large dark brown patch on apical half, tibiae yellow with large dark brown patch on basal half.	Middle legs yellow with femora almost dark brown.
(7)	Hind coxae yellow, femora yellow with large brown patch in middle.	Hind coxae and femora almost dark brown.
(8)	Wings rudimentary.	Wings well developed.
(9)	*Ripersia hibernica* Newst. as host.	Host not recorded by Mercet.

The males of the two species also differ as follows:

	P. britannicus sp. n. ♂.	*P. metallicus* Mercet. ♂
(1)	Head dark coppery.	Frontovertex almost greenish, face blue.
(2)	Antennae uniformly yellow.	Pedicel and funicle yellowish-black.
(3)	Pedicel more than half length of first funicle segment.	Pedicel one-third length of first funicle segment.
(4)	Malar space as long as one-third longitudinal diameter of eye.	Malar space almost as long as longitudinal diameter of eye.
(5)	Thoracic dorsum dark coppery; pleura and sterna light coppery.	Coloration of thorax as in female.
(6)	Hind coxae, femora yellow with large brown patch on middle region of femora.	Hind coxae, femora almost dark brown.
(7)	Wings rudimentary.	Wings well developed.
(8)	Abdomen subtriangular.	Abdomen oval.

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IV. Key to Lettering of Figures.

a, antero-lateral apodeme.
b, basal side.
c, cone-like extension.
cxs, coxal suture.
g, mid-longitudinal groove.
k, knob.
mi, marginal inflection.
p, third valvula.
p^1, puncture.
R, ramus of submarginal ridge.
r, ridge of knob.
s, seta.
sos, subocular suture.
sr, submarginal ridge.
t, thickened dorsal margin.
tp, mid-longitudinal thickening.

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